




47LG90

Direct View LCD





OUTLINE

Section 1

Contact Information, Preliminary Matters, Specifications, LCD Overview, General Troubleshooting Steps, Signal Distribution, Disassembly Instructions and Voltages

Section 2

Circuit Board Operation, Troubleshooting of :

- Switch mode Power Supply
- NEW • LED Backlight System
- Main Board
- T-CON Board NEW: Two control connections to the Inverters for Global and Local Dimming
- Ft Control Board



47LG90 LCD Direct View Display

Section 1

This Section will cover Contact Information and remind the Technician of Important Safety Precautions for the Customers Safety as well as the Technician and the Equipment.

Basic Troubleshooting Techniques which can save time and money sometimes can be overlooked. These techniques will also be presented.

This Section will get the Technician familiar with the Disassembly, Identification and Layout of the LCD Display Panel.

At the end of this Section the Technician should be able to Identify the Circuit Boards and have the ability and knowledge necessary to safely remove and replace any Circuit Board or Assembly.



IMPORTANT SAFETY NOTICE

The information in this training manual is intended for use by persons possessing an adequate background in electrical equipment, electronic devices, and mechanical systems. In any attempt to repair a major Product, personal injury and property damage can result. The manufacturer or seller maintains no liability for the interpretation of this information, nor can it assume any liability in conjunction with its use. When servicing this product, under no circumstances should the original design be modified or altered without permission from LG Electronics. Unauthorized modifications will not only void the warranty, but may lead to property damage or user injury. If wires, screws, clips, straps, nuts, or washers used to complete a ground path are removed for service, they must be returned to their original positions and properly fastened.

CAUTION

To avoid personal injury, disconnect the power before servicing this product. If electrical power is required for diagnosis or test purposes, disconnect the power immediately after performing the necessary checks. Also be aware that many household products present a weight hazard. At least two people should be involved in the installation or servicing of such devices. Failure to consider the weight of an product could result in physical injury.



ESD NOTICE (Electrostatic Static Discharge)

Today's sophisticated electronics are electrostatic discharge (ESD) sensitive. ESD can weaken or damage the electronics in a manner that renders them inoperative or reduces the time until their next failure. Connect an ESD wrist strap to a ground connection point or unpainted metal in the product. Alternatively, you can touch your finger repeatedly to a ground connection point or unpainted metal in the product. Before removing a replacement part from its package, touch the anti-static bag to a ground connection point or unpainted metal in the product. Handle the electronic control_assembly by its edges only. When repackaging a failed electronic control assembly in an anti-static bag, observe these same precautions.

REGULATORY INFORMATION

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient or relocate the receiving antenna; Increase the separation between the equipment and the receiver; Connect the equipment to an outlet on a different circuit than that to which the receiver is connected; or consult the dealer or an experienced radio/TV technician for help.

CONTACT INFORMATION

Customer Service (and Part Sales)	**(800) 243-0000**
Technical Support (and Part Sales)	**(800) 847-7597**
USA Website (GCSC)	**aic.lgservice.com**
Customer Service Website	**us.lgservice.com**
LG CS Academy	**lgcsacademy.com**
LG Web Training	**lge.webex.com**

Published February 2009 by LG Technical Support and Training

LG Electronics Alabama, Inc.
201 James Record Road,
Huntsville, AL, 35813.



Safety & Handling Regulations

1. Approximately 20 minute pre-run time is required before any adjustments are performed.
2. Refer to the Voltage Sticker on the Switch Mode Power Supply silk screening. (+/- ½ volt).
3. Be cautious of electric shock from the Backlight section, it uses high voltage AC. Check that the Power Supply and Drive Circuits are completely discharged because of residual current stored before Circuit Board removal.
4. C-MOS circuits are sensitive to static electricity. Use caution when dealing with these IC and circuits.
5. Exercise care when making voltage and waveform checks to prevent costly short circuits from damaging the unit.
6. Be cautious of lost screws and other metal objects to prevent a possible short in the circuitry.

Checking Points to be Considered

1. Check the appearance of the Replacement Panel and Circuit Boards for both physical damage and part number accuracy.
2. Check the model label. Verify model names and board model matches.
3. Check details of defective condition and history. Example: Oscillator failure dead set, etc…

Basic Troubleshooting Steps

Define, Localize, Isolate and Correct

•**Define** Look at the symptom carefully and determine what circuits could be causing the failure. Use your senses Sight, Smell, Touch and Hearing. Look for burned parts and check for possible overheated components. Capacitors will sometimes leak dielectric material and give off a distinct odor. Frequency of power supplies will change with the load. **Observation of the front Power LED may give some clues.**

•**Localize** After carefully checking the symptom and determining the circuits to be checked and after giving a thorough examination using your senses the first check should always be the DC Supply Voltages to those circuits under test. Always confirm the supplies are not only the proper level but be sure they are noise free. If the supplies are missing check the resistance for possible short circuits.

•**Isolate** To further isolate the failure, check for the proper waveforms with the Oscilloscope to make a final determination of the failure. Look for correct Amplitude Phasing and Timing of the signals also check for the proper Duty Cycle of the signals. Sometimes "glitches" or "road bumps" will be an indication of an imminent failure.

•**Correct** The final step is to correct the problem. Be careful of ESD and make sure to check the DC Supplies for proper levels. Make all necessary adjustments and lastly always perform a Safety AC Leakage Test before returning the product back to the Customer.



47LG90 Product Information



This section of the manual will discuss the specifications of the 47LG90 LCD Direct View Display Panel.

Basic Specifications

- Full HD 1080p Resolution (1920 x 1080)
- 1,000,000:1 Dynamic Contrast Ratio
- TruMotion 120Hz
- 4x HDMI™ V.1.3 with Deep Color
- Intelligent Sensor
- 24p Real Cinema
- AV Mode (Cinema, Sports, Game)
- Clear Voice
- LG SimpLink™ Connectivity
- Invisible Speaker System
- USB 2.0 (JPEG, MP3)
- ISFccc



Basic Specifications (LOGO Familiarization) Page 1



Full HD 1080p Resolution
Displays HDTV programs in full **1920 x 1080p** resolution for a more detailed picture.



TruMotion 120Hz
Advance 120Hz panel provides clear, smooth images, even during fast action scenes creating a stable structure for a crisper picture.



Intelligent Sensor
Unlike other sensors which can only sense brightness of ambient light, LG's "Intelligent Sensor" uses 4,096 sensing steps to evaluate its surroundings. Using a sophisticated algorithm, the LG processes picture quality elements including brightness, contrast, color, sharpness and white balance. The result is a picture optimized for it's surroundings, more pleasing to watch and which can also save up to 50% in power consumption.

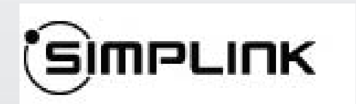


24p Real Cinema
Hi-def movies run at exactly 24 frames per second speed that they were originally filmed in, making your home-cinema experience one step closer to a "Real Cinema" experience.

Basic Specifications (LOGO Familiarization) Page 2



Clear Voice Technology
Automatically enhances and amplifies the sound of the human voice frequency range to provide high-quality dialogue when background noise swells.



SIMPLINK
Allows for convenient control of other LG SimpLink products using the existing HDMI connection.



Invisible Speaker System
A new invisible speaker system tuned by renowned audio expert, Mr. Mark Levinson. This unique system incorporates speaker actuators around the perimeter of the entire bezel, eliminating traditional speaker drivers and associated grills. This not only allows for a sleek, finished look, but also offers a wider “sweet spot” by creating a virtual “wall” of sound.

Basic Specifications (LOGO Familiarization) Page 3



LED BACKLIGHTING SYSTEM
Using LEDs for backlighting pushes picture quality to our best levels ever. Experience deep blacks through a 1,000,000:1 dynamic contrast ratio. LED backlighting also results in more natural color representation and faster response time for smoother, more natural picture motion.



USB
Viewing Photos and for Software Upgrades



ISF
Allows expert alignments to be saved.

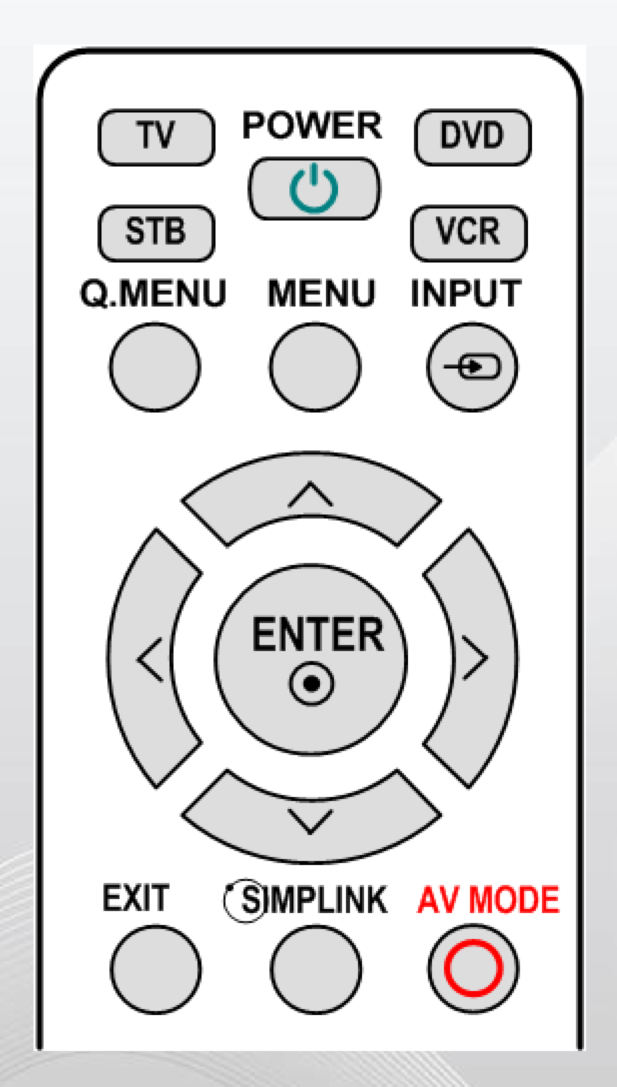


Swivel Stand
Allows the TV to rotated 20 degrees either side.



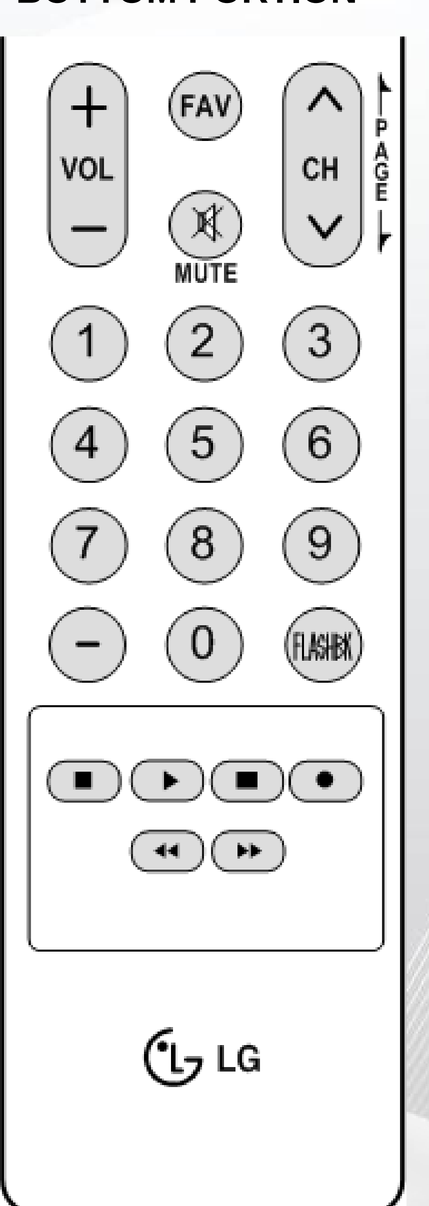
Remote Control Familiarization

TOP PORTION





BOTTOM PORTION

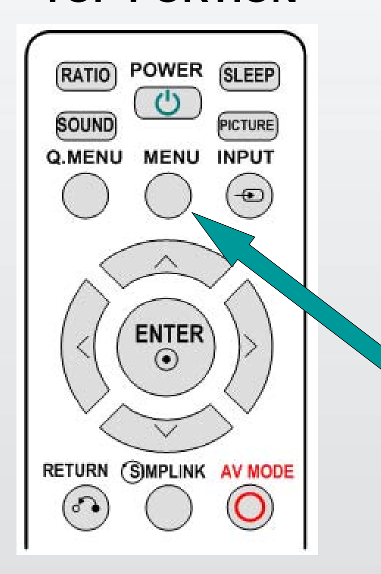






Accessing the Service Menu

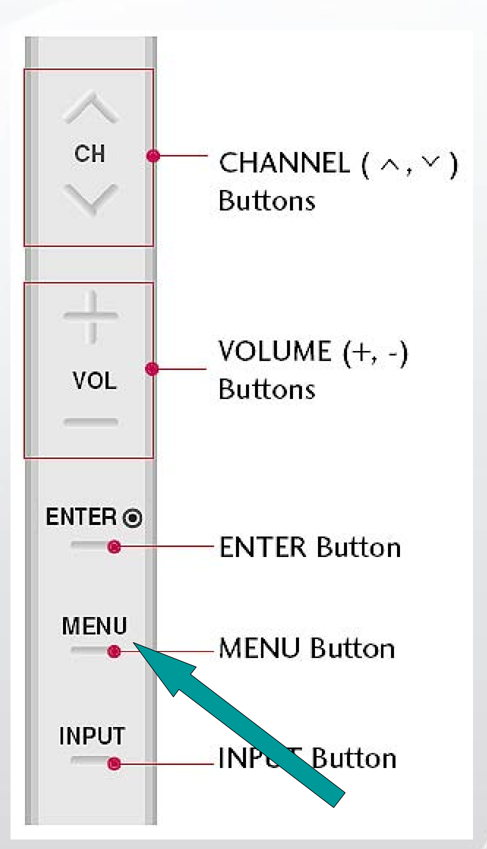
REMOTE TOP PORTION



To access the Service Menu.

1) Turn the Set On
2) Simultaneously, Press and "Hold" the Menu Key on the Side Key pad and Press and "Hold" the Menu Key on the Remote approximately 5 seconds.
3) If Customer's Menu appears, continue to hold until it disappears.
4) The Service Menu appears

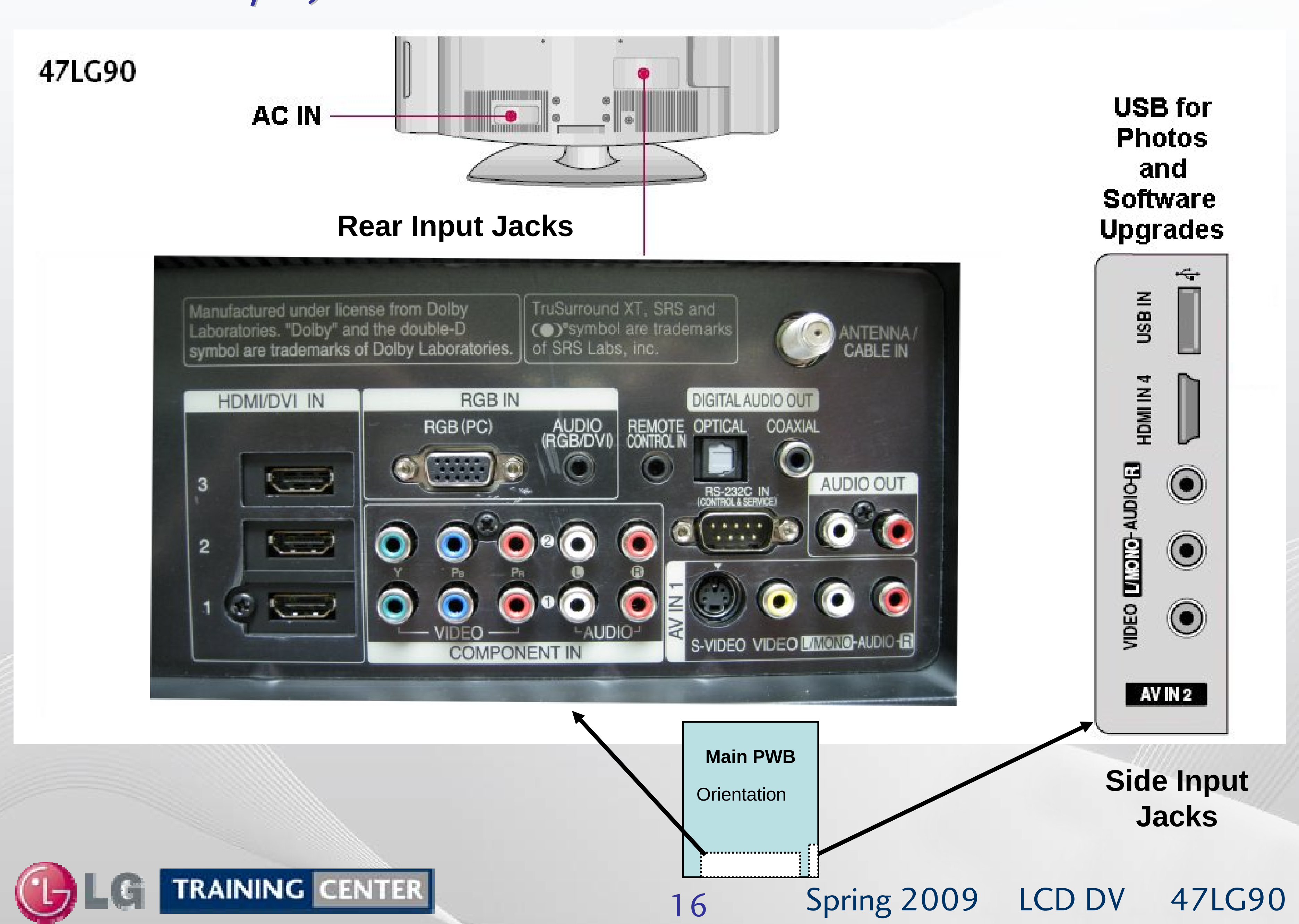
SIDE KEYS



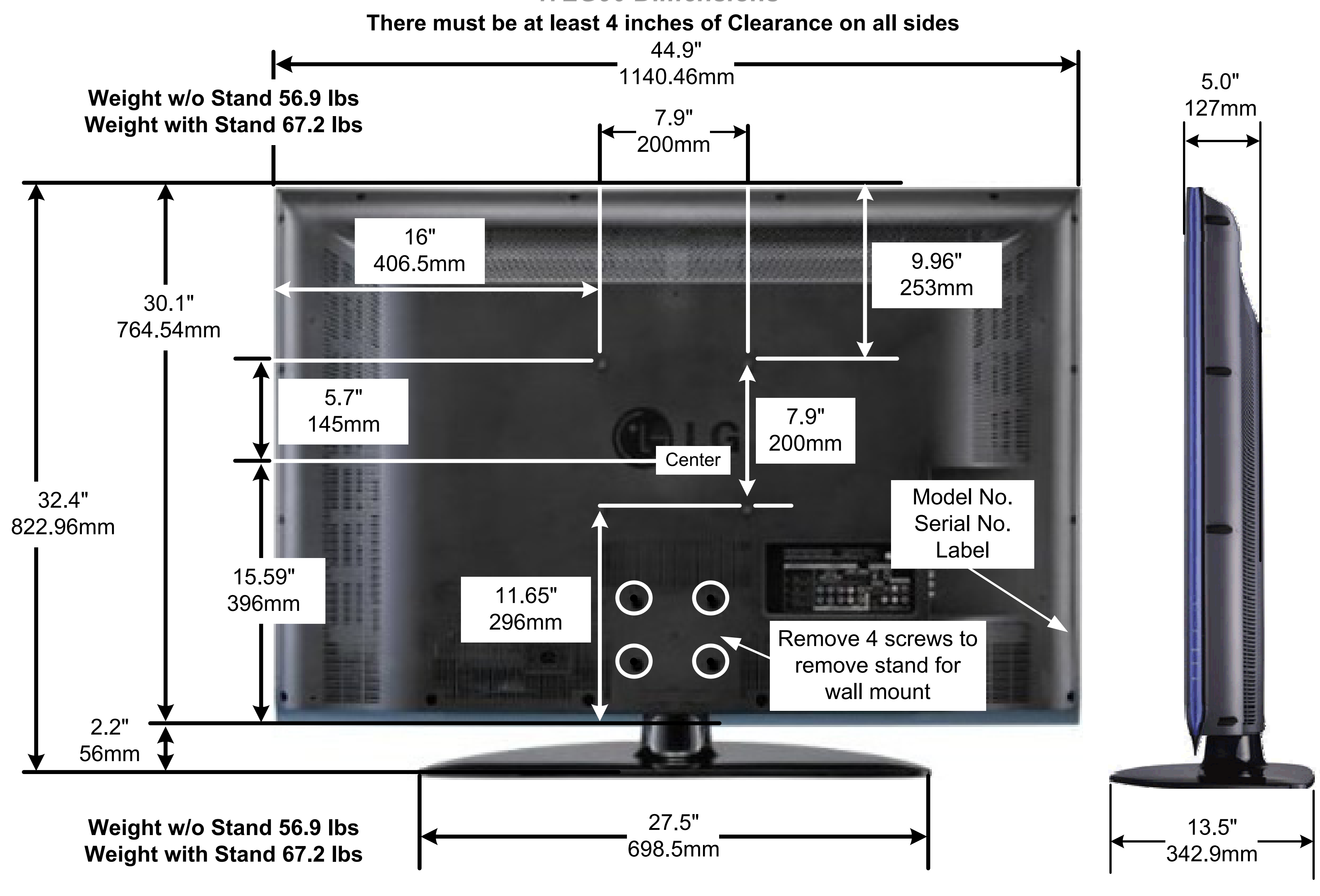
Note: It is possible, dependant upon the Software Version, a Password may be required to enter the Service Menu. If a password is required, enter

0000

Rear and Side Input Jacks



47LG90 Dimensions



DISASSEMBLY SECTION

This section of the manual will discuss Disassembly, Layout and Circuit Board Identification, of the 47LG90 LCD Direct View Television.

Upon completion of this section the Technician will have a better understanding of the disassembly procedures, the layout of the printed circuit boards and be able to identify each board.



Removing the Back Cover

The Stand does not need to be removed
Remove the 26 screws indicated.

Pay attention to the size and type of screw as there are many different types.

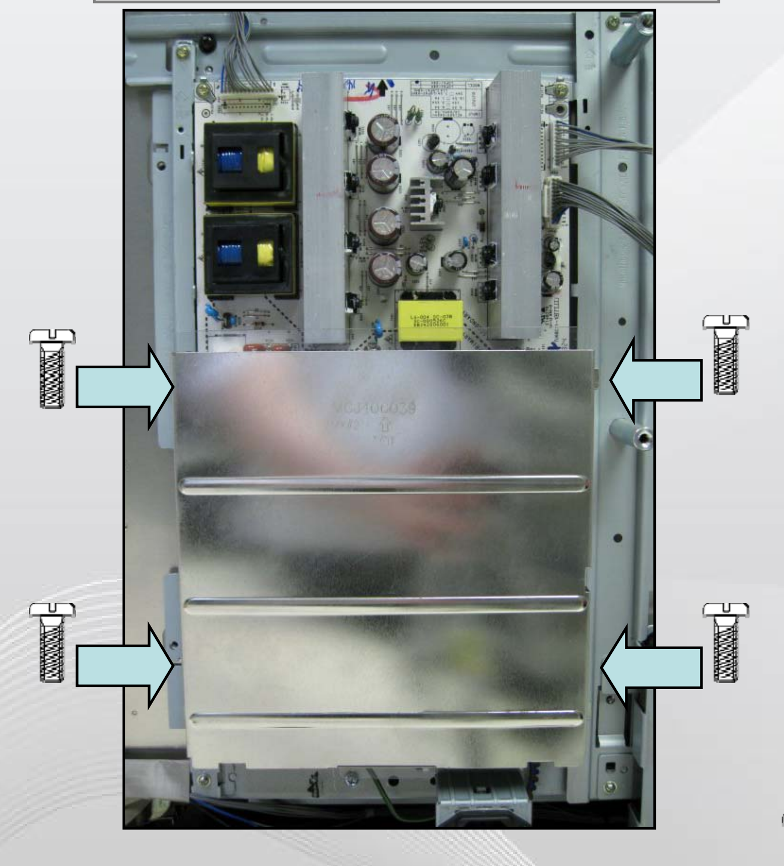
Putting in the improper screw When reassembling may Cause damage.

Bottom two Stand screws do not need to be removed.

Power Supply PWB Removal

Step 1

Remove the 4 screws indicated by the arrows and remove the shield.



Step 2

Disconnect P201, P204, P205 and AC In.
Remove the 4 screws indicated by the arrows.

Main PWB Shield Removal

Remove the two screws holding the Decorative plastic piece on the right side. Remove the plastic piece.

Remove the three pieces of tape on the left and top side that are shielding the cables as shown.

Remove the remaining 10 screws indicated by the arrows.

It is possible that your unit may have the Chocolate (Heat Transfer) material over the two large ICs. (See white squares) Maybe even behind the ICs. If so, pay attention to the location and return when reassembling.

Warning: The Tape shown Is Conductive. Do not allow to touch electrically charged components.

TAPE

TAPE

TAPE

Decorative Plastic



MAIN PWB Removal

Disconnect P1000, P1001, P800, P404 and P501
Note: In the top right is a connector P200. This is an open connection.

Remove the 2 screws securing the Main PWB.

Note: The top 2 and bottom 2 screws were removed during the shield removal process.

NOTE: Look carefully on top and behind the BCM and Micronas Chip, look for a piece of Chocolate (Heat Transfer Material). Be sure to transfer to new PWB if replaced.

P1000

P1001

P200
No Connection

P800

P404

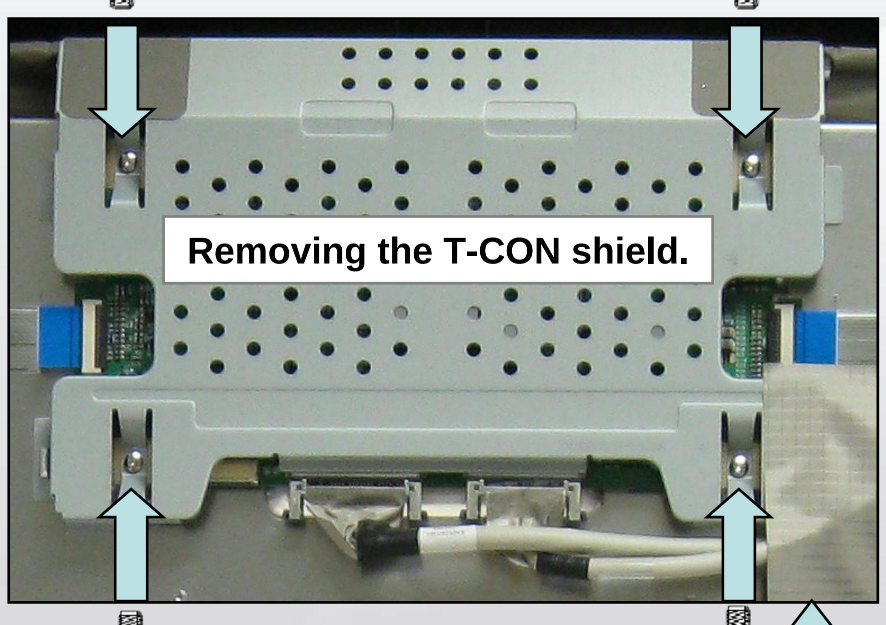
P501



T-CON (TFT Driver) PWB Removal

Look for Chocolate (Rubber like) Heat transfer material under shield. Always put back is same location.

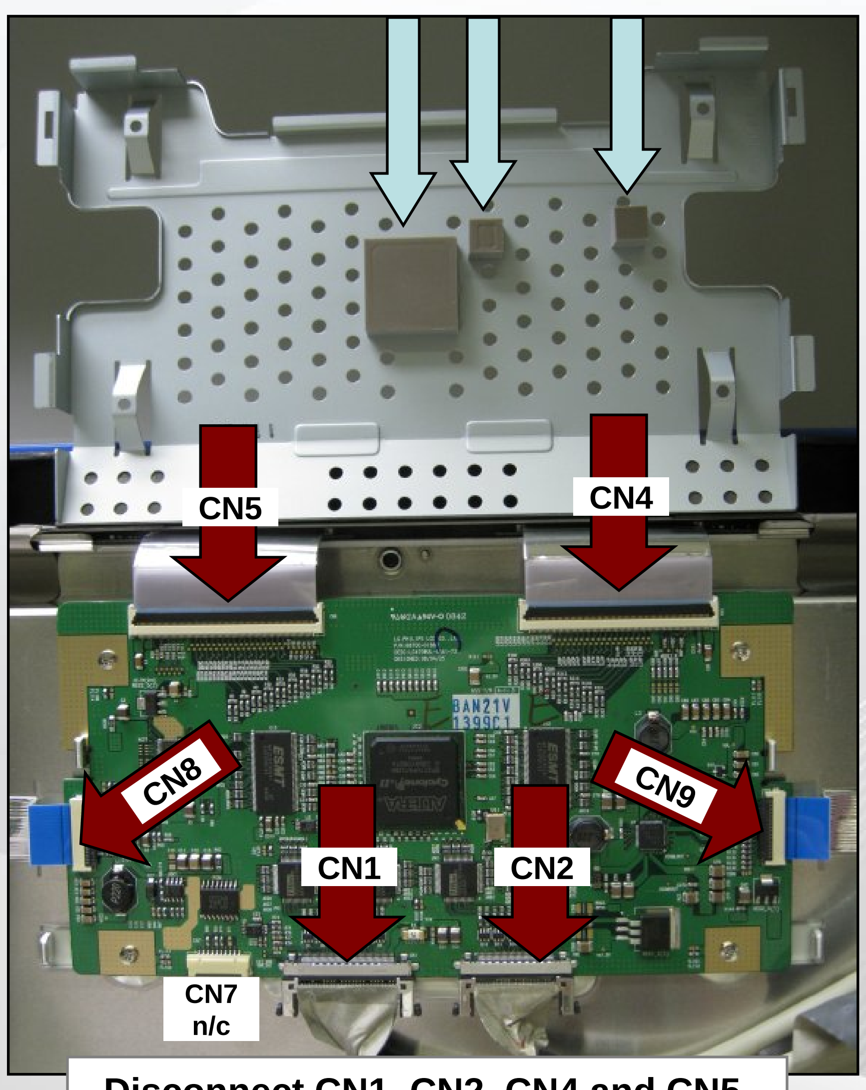
Removing the T-CON shield.



Remove and save the tape over the LVDS Cables

Warning: The Tape shown is Conductive.
Do not allow to touch electrically charged components.

"Chocolate Pads"
Heat Transfer Materials



Disconnect CN1, CN2, CN4 and CN5.
See next slide for details.



T-CON (TFT DRIVE) PWB REMOVAL CONTINUED:

UNLOCKING CN1, CN2, CN4 and CN5

To remove the flex cables to the TFT Panel, CN4 or CN5: Place a soft sharp object like a fingernail underneath the black locking tab and gently lift upward.
(Shown by the arrows in Fig 1)

Use your fingernail to release locks to avoid damage to locking mechanism.

Fig 1

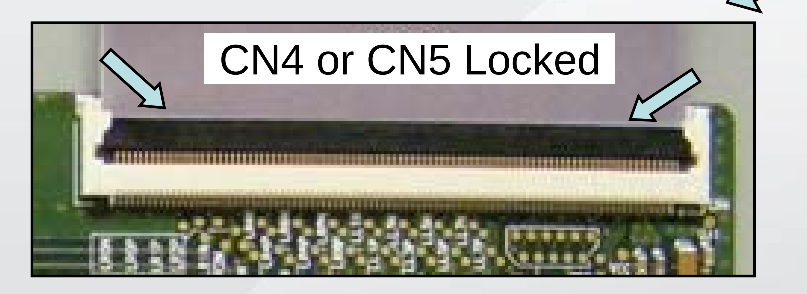
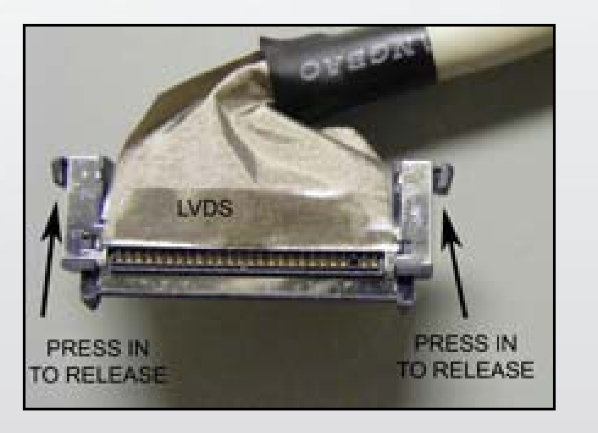


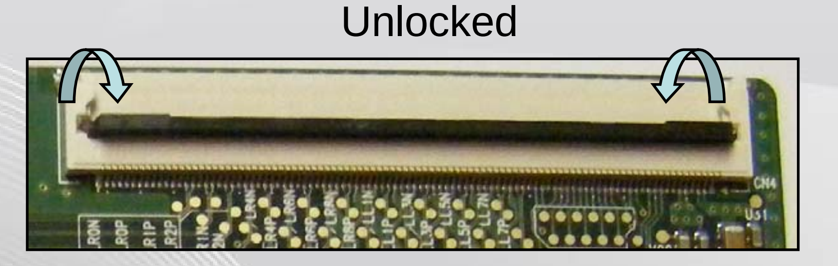
Fig 3



Flip the lock up and back from the flex cable. Then the flex cable can be easily removed.

Unlocked

Fig 2

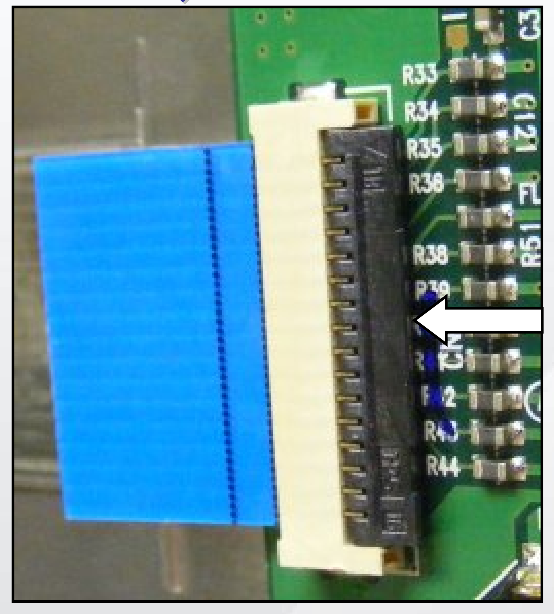


The locking tab is flipped upward

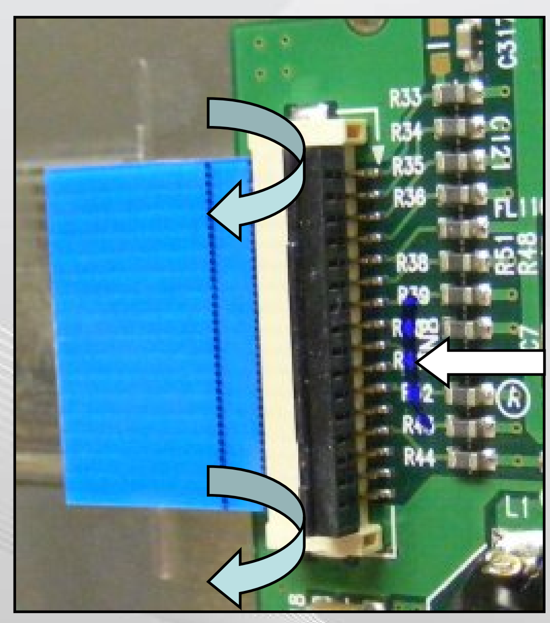
To remove the LVDS cables for CN1 or CN2; Press in on the two tabs and slowly rock the cable out of the connector.
(Shown by the arrows in Fig 3)



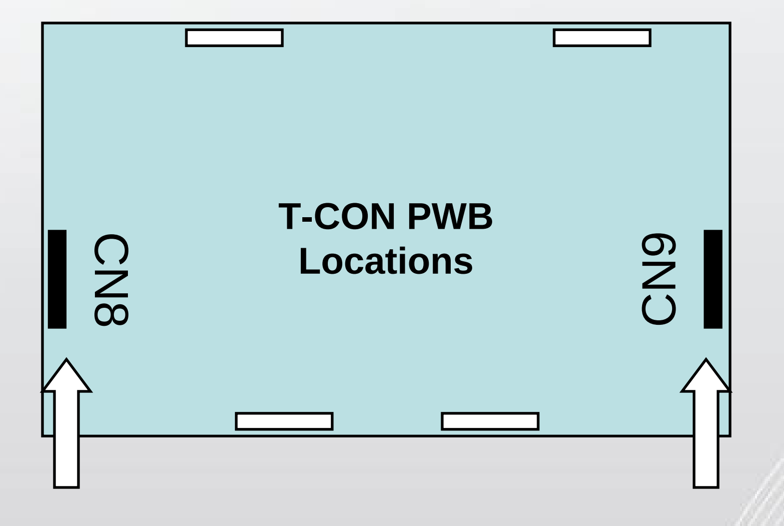
T-CON (TFT Drive) CN8 or CN9 Unlocking



Lift Evenly From this side



Unlocked Lifted Up

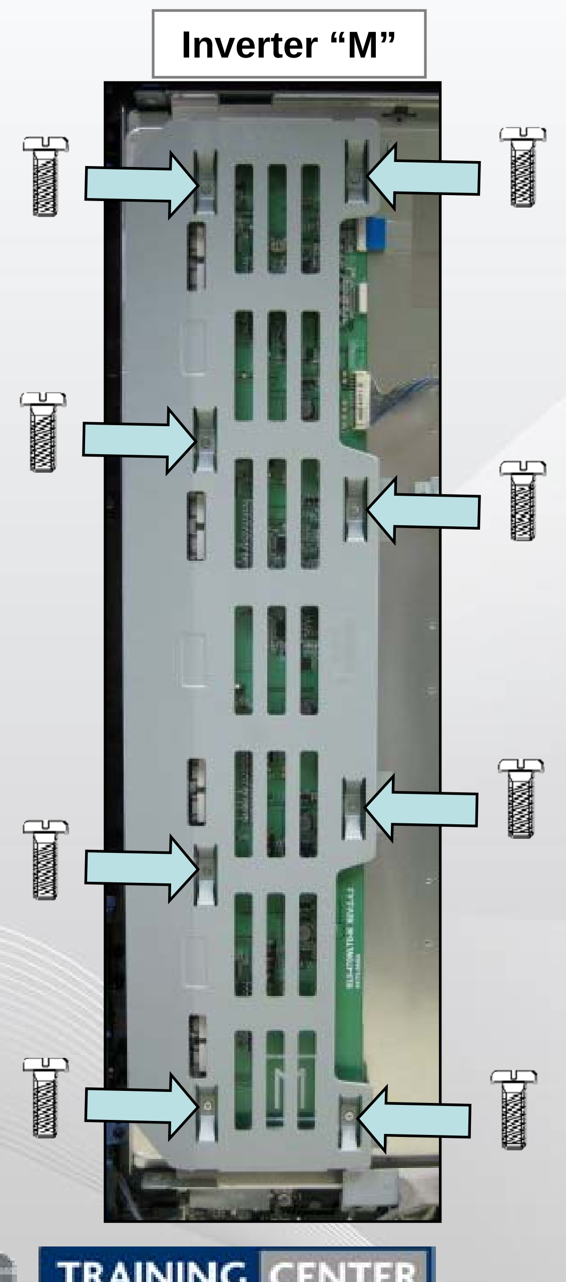


Use same procedure

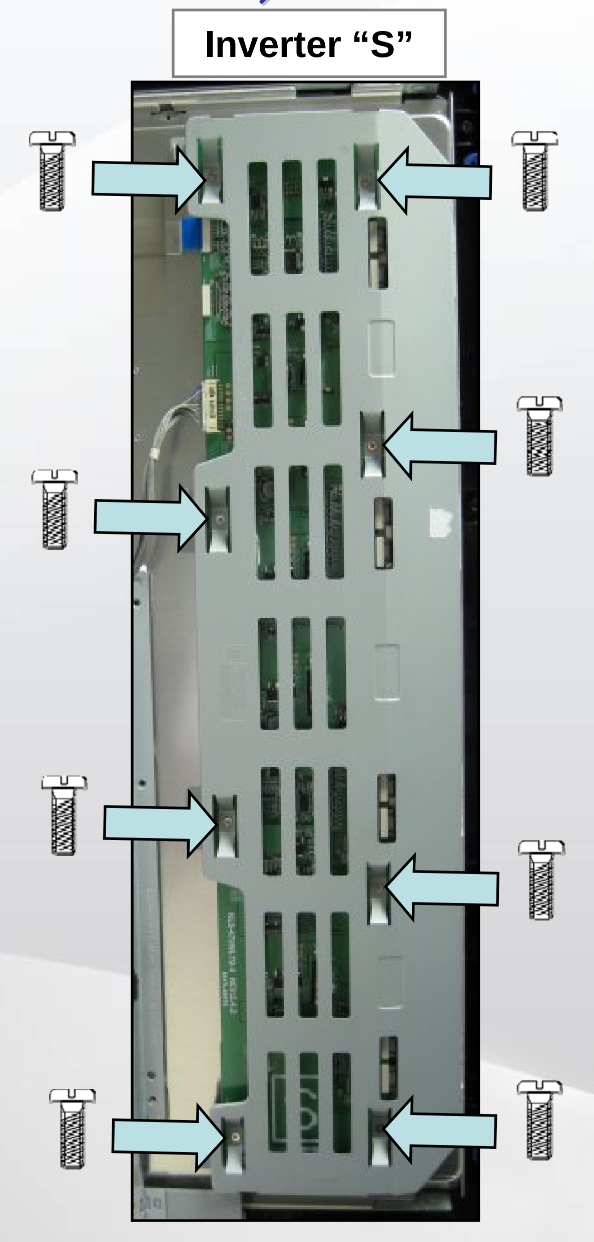


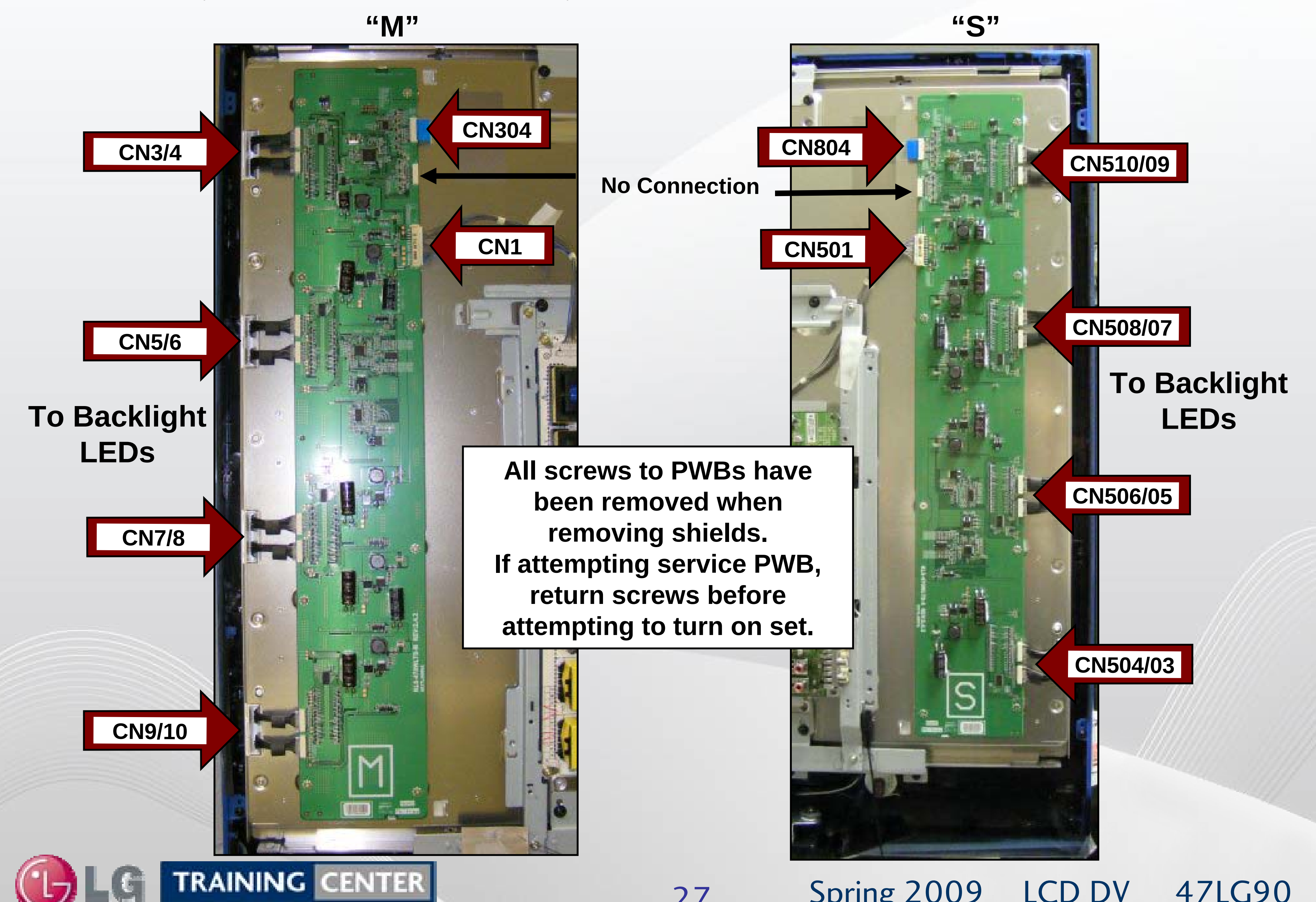

Inverters "M" and "S" PWB Removal Step 1 (Shield Removal)

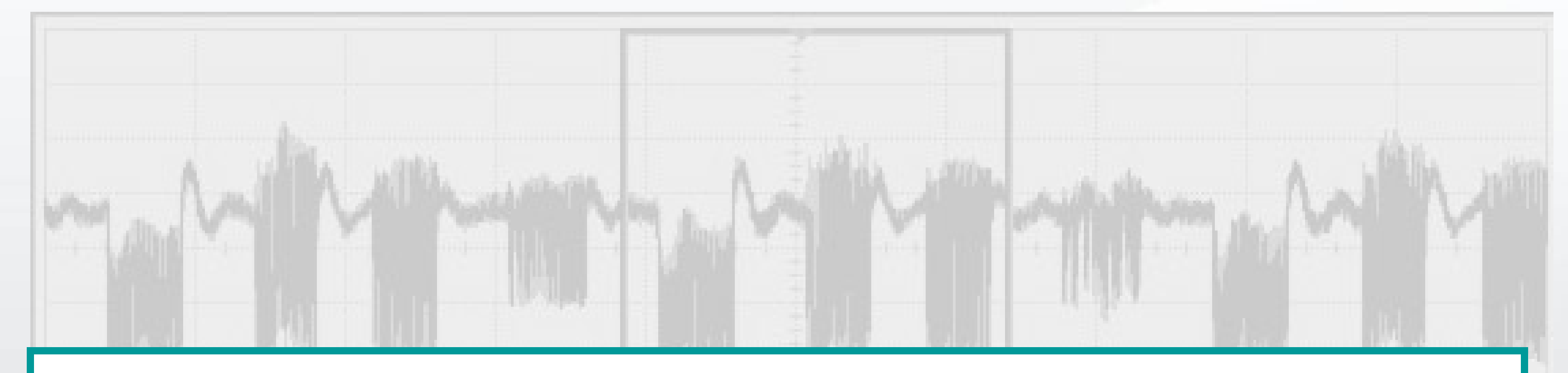
Inverter "M"



Inverter "S"




INVERTERS (BACKLIGHT LED DRIVE) PWBs "M" and "S" Removal Step 2
"M"
"S"
CN3/4
CN304
CN1
CN5/6
CN7/8
CN9/10
To Backlight LEDs
No Connection
CN804
CN501
CN510/09
CN508/07
CN506/05
CN504/03
To Backlight LEDs
All screws to PWBs have been removed when removing shields.
If attempting service PWB, return screws before attempting to turn on set.
LG TRAINING CENTER

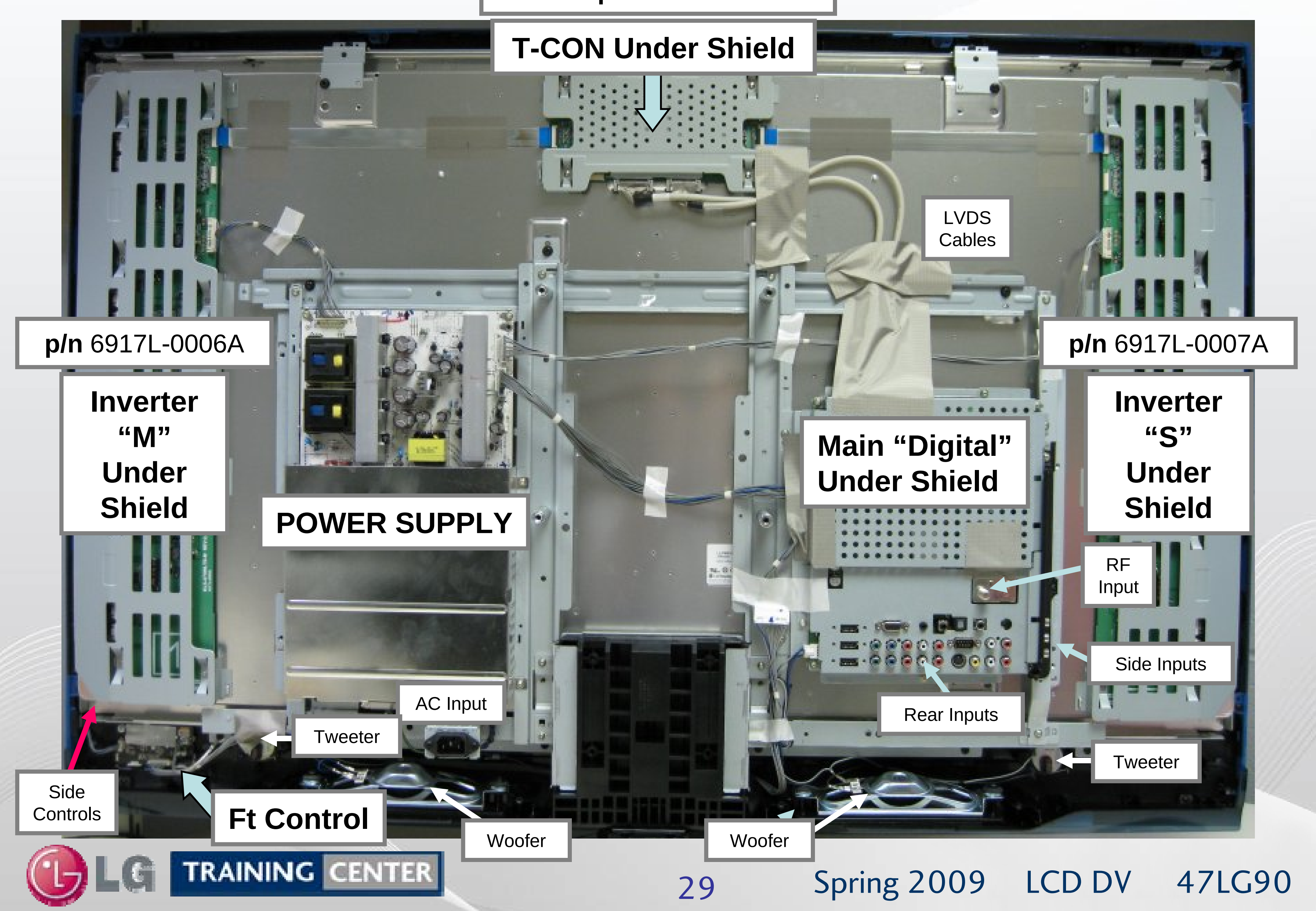


This section of the manual will discuss troubleshooting.

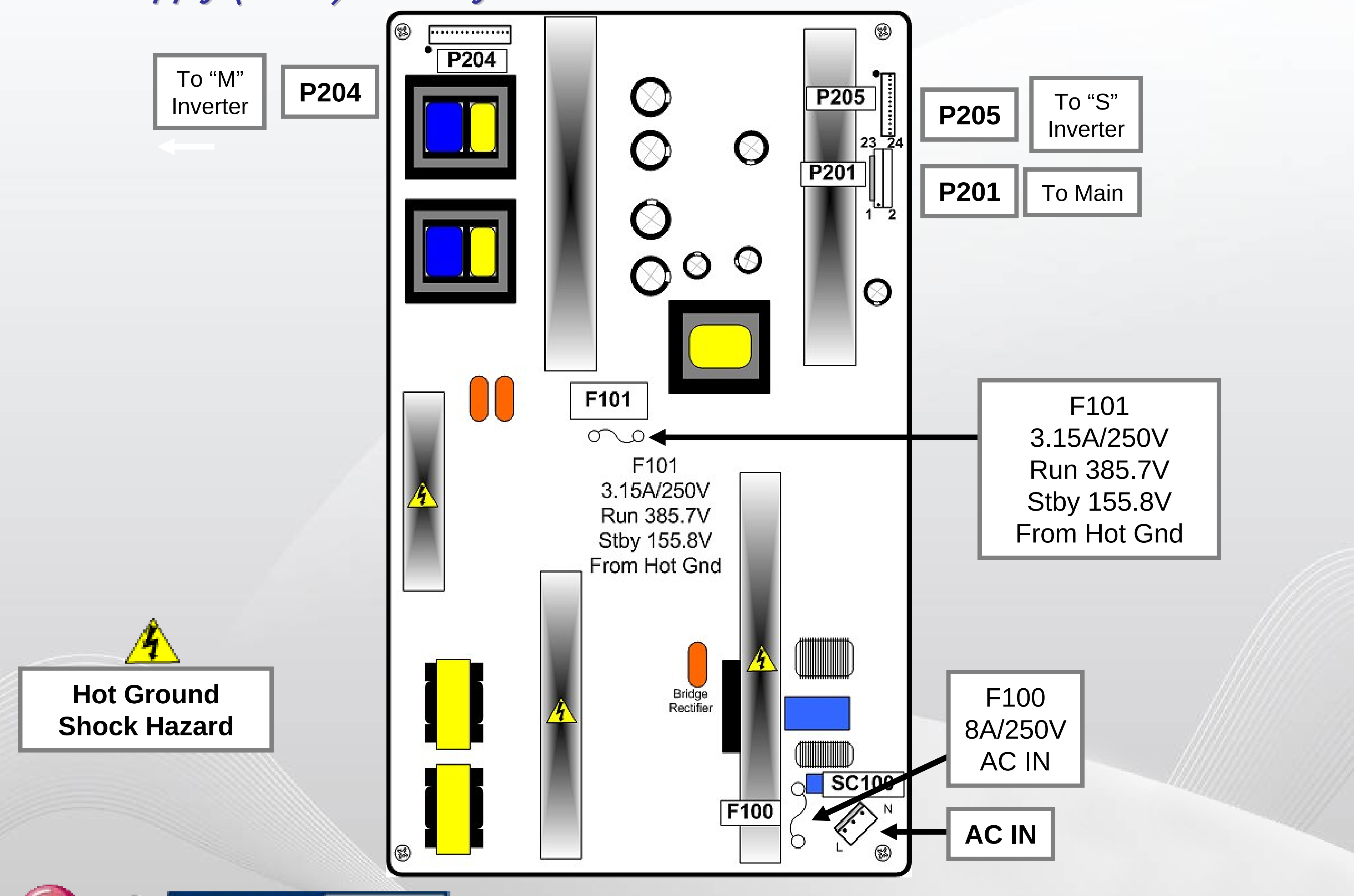
Upon completion of this section the Technician will have a better understanding of how to diagnosis and resolve problems.



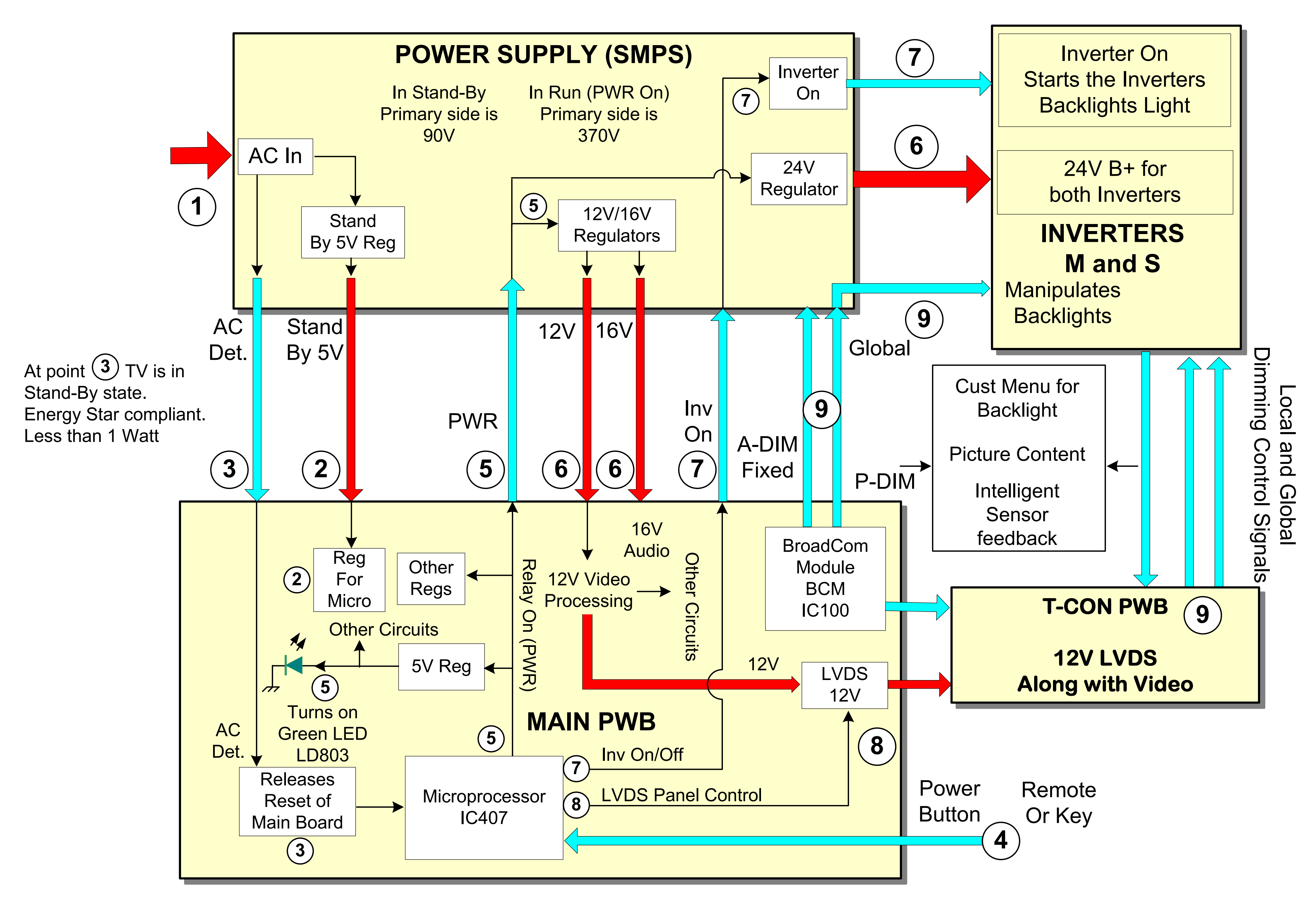
Circuit Board Layout

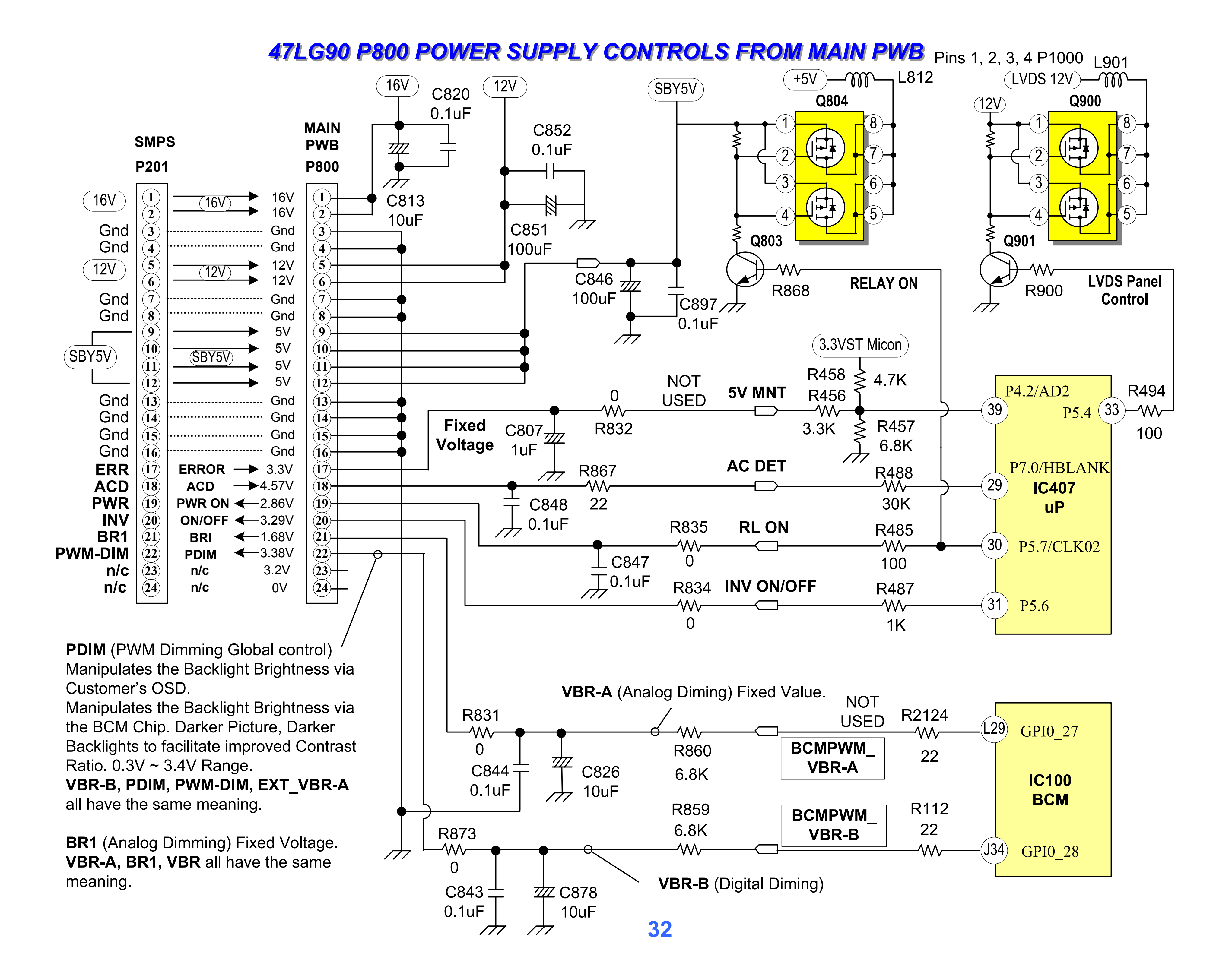


Power Supply (SMPS) PWB Layout



47LG90 POWER SUPPLY
TURN ON COMMANDS FROM MAIN PWB




47LG90 P800 POWER SUPPLY CONTROLS FROM MAIN PWB
Pins 1, 2, 3, 4 P1000
L901
LVDS 12V
+5V
L812
Q804
Q900
12V
16V
C820
0.1uF
SBY5V
C852
0.1uF
SMPS
P201
MAIN
PWB
P800
C813
10uF
C851
100uF
C846
100uF
C897
0.1uF
Q803
R868
RELAY ON
Q901
R900
LVDS Panel
Control
16V
Gnd
Gnd
12V
Gnd
Gnd
SBY5V
Gnd
Gnd
Gnd
Gnd
ERR
ACD
PWR
INV
BR1
PWM-DIM
n/c
n/c
ERROR
ACD
PWR ON
ON/OFF
BRI
PDIM
n/c
n/c
3.3V
4.57V
2.86V
3.29V
1.68V
3.38V
3.2V
0V
5V
3.3VST Micon
R458
4.7K
R456
3.3K
R457
6.8K
NOT
USED
5V MNT
0
R832
Fixed
Voltage
C807
1uF
R867
22
C848
0.1uF
AC DET
R488
30K
R835
0
RL ON
R485
100
C847
0.1uF
R834
0
INV ON/OFF
R487
1K
P4.2/AD2
P5.4
R494
100
P7.0/HBLANK
IC407
uP
P5.7/CLK02
P5.6
PDIM (PWM Dimming Global control)
Manipulates the Backlight Brightness via
Customer's OSD.
Manipulates the Backlight Brightness via
the BCM Chip. Darker Picture, Darker
Backlights to facilitate improved Contrast
Ratio. 0.3V ~ 3.4V Range.
VBR-B, PDIM, PWM-DIM, EXT_VBR-A
all have the same meaning.
BR1 (Analog Dimming) Fixed Voltage.
VBR-A, BR1, VBR all have the same
meaning.
VBR-A (Analog Diming) Fixed Value.
R831
0
C844
0.1uF
C826
10uF
R860
6.8K
NOT
USED
BCMPWM_
VBR-A
R2124
22
GPI0_27
IC100
BCM
R859
6.8K
BCMPWM_
VBR-B
R112
22
GPI0_28
R873
0
C843
0.1uF
C878
10uF
VBR-B (Digital Diming)
32

Power Supply Troubleshooting

Ac voltage is supplied to the Power Supply at Connector SC100. AC Detect is generated and should be present at connector P201 pin 8 (5V). The AC input also generates a Hot Ground primary power supply that runs in two states, Stand-By (156V) and Run (386V) measured at Fuse F101. This primary voltage develops all other voltages that are output from the power supply. During Stand-By, the 5 Volt Standby should be present at connector P201, Pins 9,10,11 or 12. If Missing remove AC Power and unplug Connector P201, apply AC Power and recheck for presence of both 5 Volt Standby and AC Detect. Loss of either 5 Volt Standby or AC Detect would be a Power Supply Failure. Presence of 5 Volt Standby and AC Detect would be an indication of a failure on the Main Board. Suspect a possible short circuit loading the supply. **Remember to observe the Front Power Indicating LED this may save some time. A lit LED most likely indicates the Stand-By 5V voltage is present!**

A loss of the AC Detect line will prevent the front power LED from lighting. Because it is driven by I^2C bus communication.

The Main Board sends two commands to the Power Supply Board one being PWR the other is INV ON. These two voltages are used to control the power on turn on sequence. First via PWR (Pin 19) also known as RL ON activates the 24Volt to the Inverters and the 16 Volt and 12 Volt lines to the Main board.
The 2nd command is INV ON. It passes through the Power Supply to the Inverter Boards to turn them on. If either command voltage (PWR or INV ON) is missing it will result in a no picture symptom. These voltages can easily be checked with the volt meter! Remove AC Power, unplug Connector P204, reapply AC Power and press the ON-OFF Button on either the Remote Control or Power Button on the Unit. Watch for the Power ON LED to change color from red to blue. This is an indication the PWR Signal was created on the the Main board. Check P800 or P201 pin 19 for the PWR command (2.8V) to the Power Supply. Check P201 for 16V (Pins 1 or 2) and 12V (Pins 5 or 6). Check P204/P205 Pins 1,2,3,4 or 5 for the presence of the 24 Volt Supply. Confirm Pin 12 of P204/P205 went to 3.3V. This is the INV ON signal needed to turn on the Inverters and light the backlight LEDs.
Problems with either voltage can be easily solved by following the simple steps on the next page.



TEST 1 Power Supply PWB Low Voltage Test

AC Should not be applied at any time while adding resistors or while unplugging connectors as damage to the circuit PWB may occur.

a) The SMPS PWB "MUST" be producing STBY 5V on pins 9, 10, 11 or 12 (5V).
b) The SMPS PWB "MUST" be generating ACD (AC Detect) Pin 18 check for 5V.

If the conditions (a) or (b) above are not met, the SMPS PWB is defective and must be replaced. There is no need to continue with the test.

(c) Unplug P800 on Main PWB and P204, P205 to the inverters.

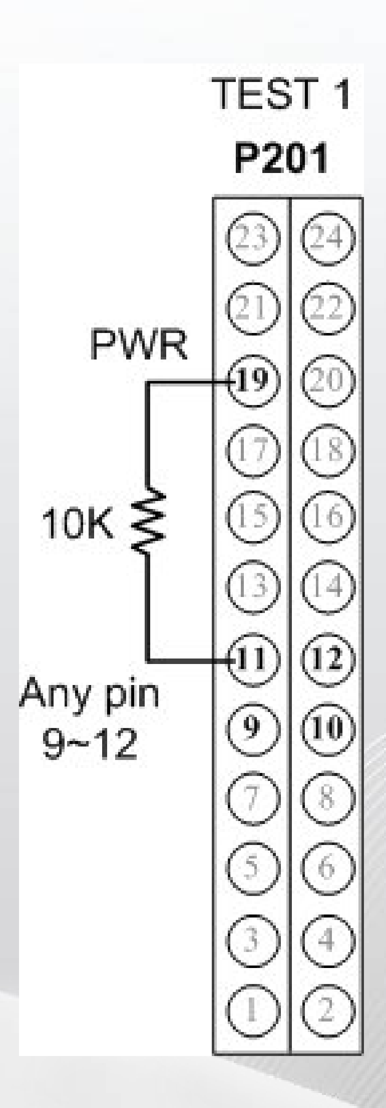
TEST 1:

(2) Add a 10K resistor between (5V STBY) pin 9, 10, 11 or 12 and Pin 19 (PWR). Apply AC. This will turn on the power supply.

a) Check that the 16V and 12V power supplies are turned on, P201 (16V pins 1 and 2) (12V pins 5 and 6)

b) Check that the 24V (Inverter B+) is turned on on P205 and P204 pins 1~5.

(3) Remove AC power. Reinsert the plugs P204/P205 to the inverters.



TEST 2 Power Supply PWB Backlights Test

P800 Connector disconnected from the Main PWB. Apply AC after adding jumper.

Continue if the 1st test was successful. Leave original 10K resistor in place.

(4) Add a jumper wire between Pin 20 (INV On/Off) to Pin 19 (PWR).

(5) Apply AC Power. This simulates a Power On and Backlight On command.

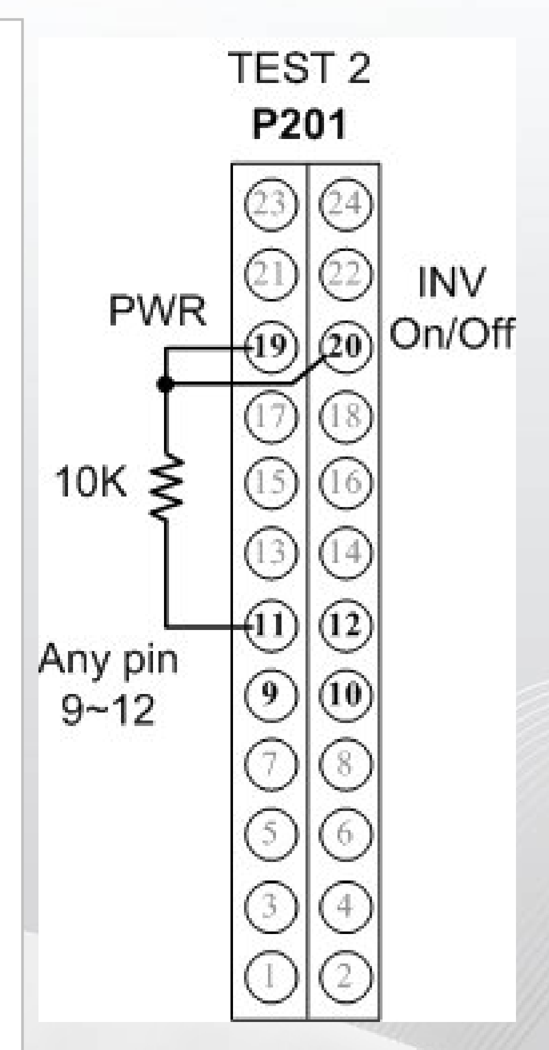
Observe the Backlights.

a) If normal, the backlights should turn on. (They will be dim.)

b) If no backlight activity, reconfirm the 24V is being generated and output on P204/P205 connector Pins 1~5. If not, unplug P204 or P205 and recheck. If not SMPS is defective. If yes, Inverter is loading down the 24V line.

d) Confirm the INV On/Off line Pin 20 is going to 3V. Confirm the Inverter On command is leaving P204/P205 Pin 12.

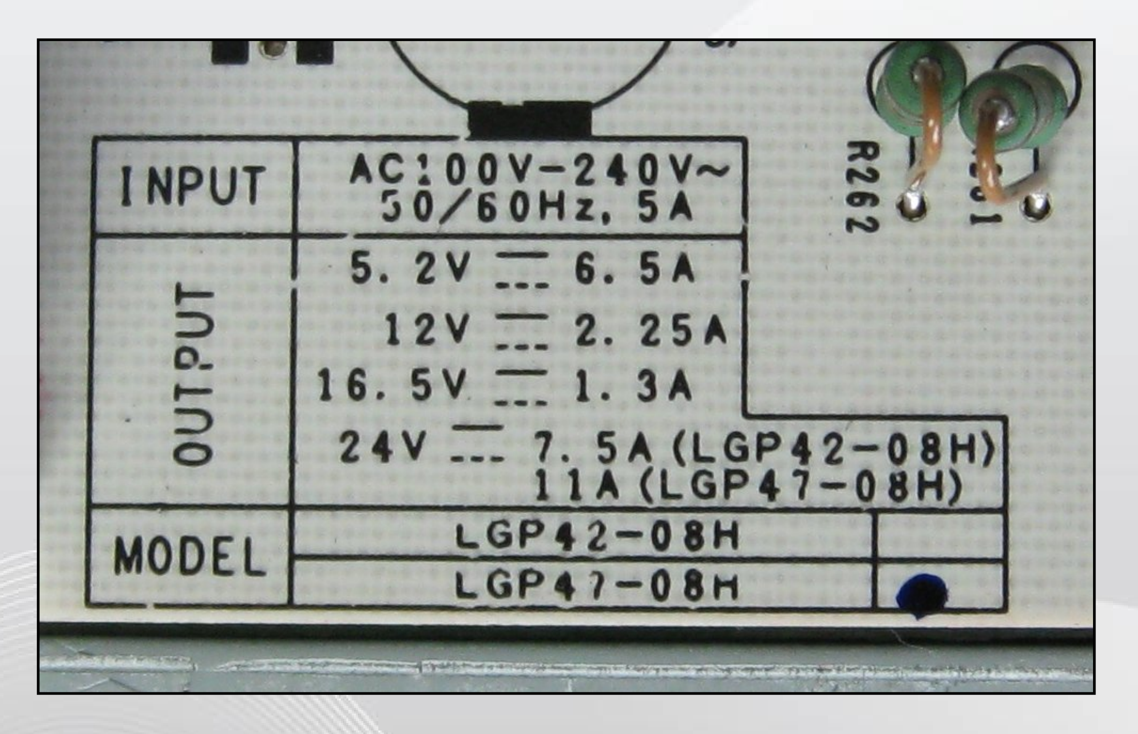
e) If all the above is normal, refer to the Inverter section to check voltages on the Inverters.



TEST 2 Power Supply PWB Backlights Test

Using the Power Supply (SMPS) Voltage Label (Silk Screen)

Using the (Silk Screen) Label can assist when dealing with an over current situation. Normal loads will keep the current reading under the Label's maximum currents output reading



The AC input Fuse draws a maximum current 5 Amps

The 5.2V output (Stand by 5V) maximum output current 6.5 Amps

The 12V output (Video Processing and T-CON board B+) maximum output current 2.25 Amps

The 16.5V output (Audio) maximum output current 1.3 Amps

The 24V output (Inverters) maximum output current 11 Amps

Power Supply Connector P201 Voltage and Resistance

P201 Odd "SMPS" to P800 "Main PWB"

Pin	Label	STBY	Run	Diode Check
1	16.5V	0V	16.6V	0.49V
3	Gnd	Gnd	Gnd	Gnd
5	12V	0V	12V	1.6V
7	Gnd	Gnd	Gnd	Gnd
9	5V	5.1V	5.1V	1.27V
11	5V	5.1V	5.1V	1.27V
13	Gnd	Gnd	Gnd	Gnd
15	Gnd	Gnd	Gnd	Gnd
17	Error	0V	0V	0V
19	PWR-On	0V	2.7V	1.6V
21	[1]BRI	0V	1.7V	0V
23	n/c	0V	0V	0V

[1]**Pin 21 BRI** (ADIM) Is Fixed and is not used

P201 Even "SMPS" to P800 "Main PWB"

Pin	Label	STBY	Run	Diode Check
2	16.5V	0V	16.6V	0.49V
4	Gnd	Gnd	Gnd	Gnd
6	12V	0V	12V	1.6V
8	Gnd	Gnd	Gnd	Gnd
10	5V	5.1V	5.1V	1.27V
12	5V	5.1V	5.1V	1.27V
14	Gnd	Gnd	Gnd	Gnd
16	Gnd	Gnd	Gnd	Gnd
18	ACD	5V	5V	2.1V
20	(INV)On/Off	0V	3.2V	0V
22	[2]PDIM	0V	.3/3.4V	0V
24	n/c	0V	0V	0V

[2]**PDIM Pin 22** can vary according to type of signal being processed, OSD Backlight setting. 0.4V 0% to 3.4V 100% and the Intelligent Sensor. Output controlled from the BCM chip.

Diode Mode values taken with all Connectors Removed



Power Supply Connector P204 and P205 Voltage and Resistance

P204 "SMPS" to CN1 "INVERTER M"				
Pin	Label	STBY	Run	Diode Check
1	24V (Vin)	0V	24.6V	Open
2	24V (Vin)	0V	24.6V	Open
3	24V (Vin)	0V	24.6V	Open
4	24V (Vin)	0V	24.6V	Open
5	24V (Vin)	0V	24.6V	Open
6	Gnd	Gnd	Gnd	Gnd
7	Gnd	Gnd	Gnd	Gnd
8	Gnd	Gnd	Gnd	Gnd
9	Gnd	Gnd	Gnd	Gnd
10	Gnd	Gnd	Gnd	Gnd
11	[1]BRI	0V	1.7V	Open
12	On/Off	0V	3.2V	Open
13	[2]PWM-DIM	0V	.3/3.4V	Open
14	Error	0V	0V	Open

P205 "SMPS" to CN501 INVERTER "S"				
Pin	Label	STBY	Run	Diode Check
1	24V (Vin)	0V	24.6V	Open
2	24V (Vin)	0V	24.6V	Open
3	24V (Vin)	0V	24.6V	Open
4	24V (Vin)	0V	24.6V	Open
5	24V (Vin)	0V	24.6V	Open
6	Gnd	Gnd	Gnd	Gnd
7	Gnd	Gnd	Gnd	Gnd
8	Gnd	Gnd	Gnd	Gnd
9	Gnd	Gnd	Gnd	Gnd
10	Gnd	Gnd	Gnd	Gnd
11	[1]BRI	0V	1.7V	Open
12	On/Off	0V	3.2V	Open

SC100 "SMPS" to AC IN

Pin	Label	STBY	Run	Diode Check
1	L	120Vac		OL
2	N			OL

[1]BR1 (ADIM Pin 21) Fixed and not used

[2]PWM-DIM (PDIM Pin 22) can vary according to type of signal being processed, OSD Backlight setting. 0.3V 0% to 3.4V 100% and the Intelligent Sensor. Output from the BCM chip.

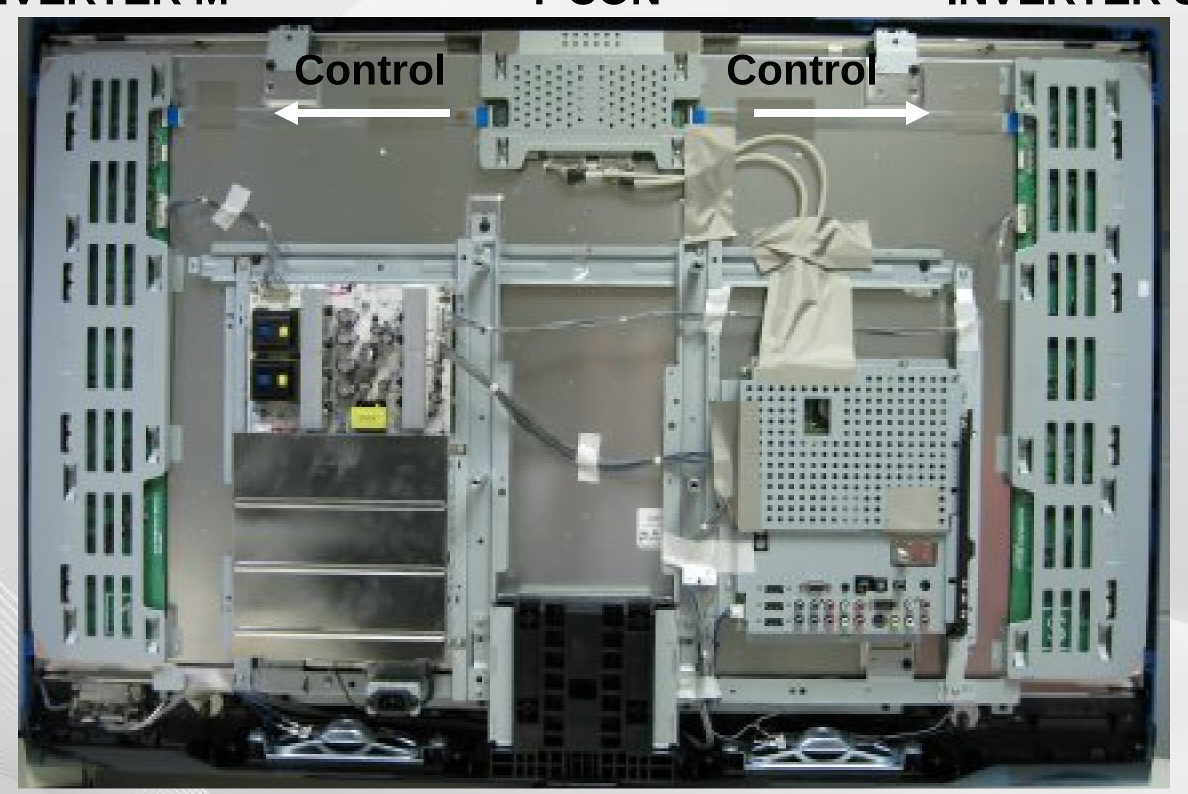
Diode Mode values taken with all Connectors Removed



INVERTERS (BACKLIGHT LED DRIVE) PWBs

NEW: This set utilizes LEDs as backlights driven by the Inverters. These LEDs are manipulated in accordance to the necessary Light Source intensity according to the video content (Contrast Ratio) demands.
Control signals to the Inverters are sent out from the T-CON PWB.
B+ (24V) is sent from the Power Supply (SMPS).
There are 8 Vertical columns and 16 horizontal rows for a total of 128 individual LED Blocks. Each Block contains 12 LEDs (3 X 4).

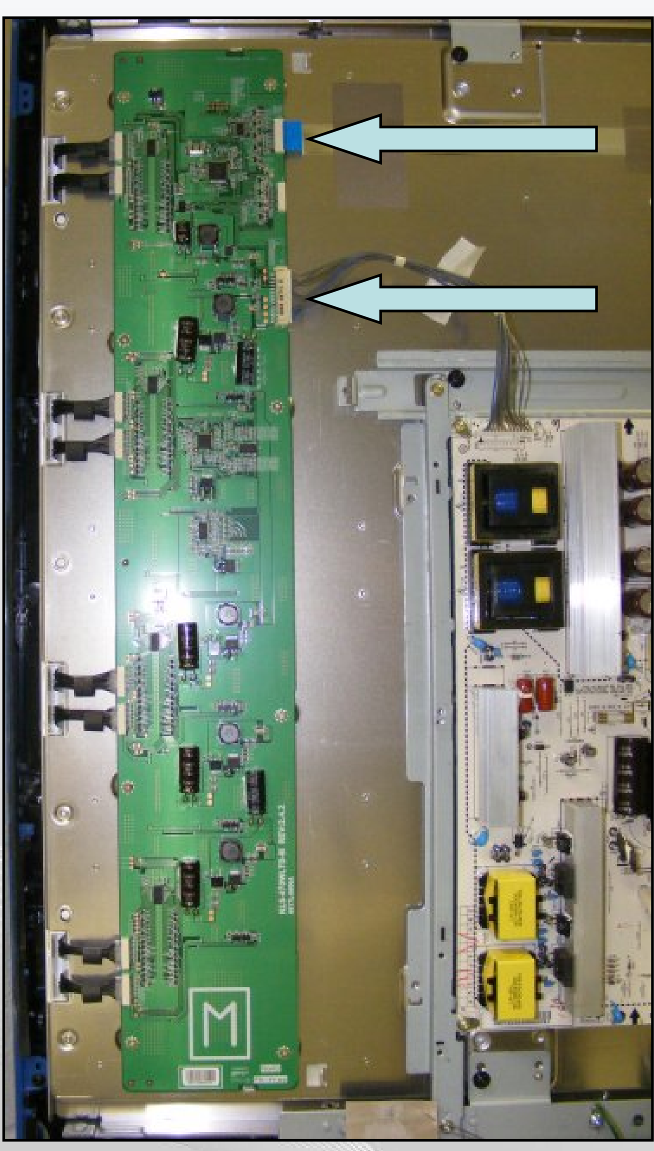
INVERTER M **T-CON** **INVERTER S**



INVERTERS SECTION (BACKLIGHT LED DRIVE) PWBs "M" and "S"

"M"

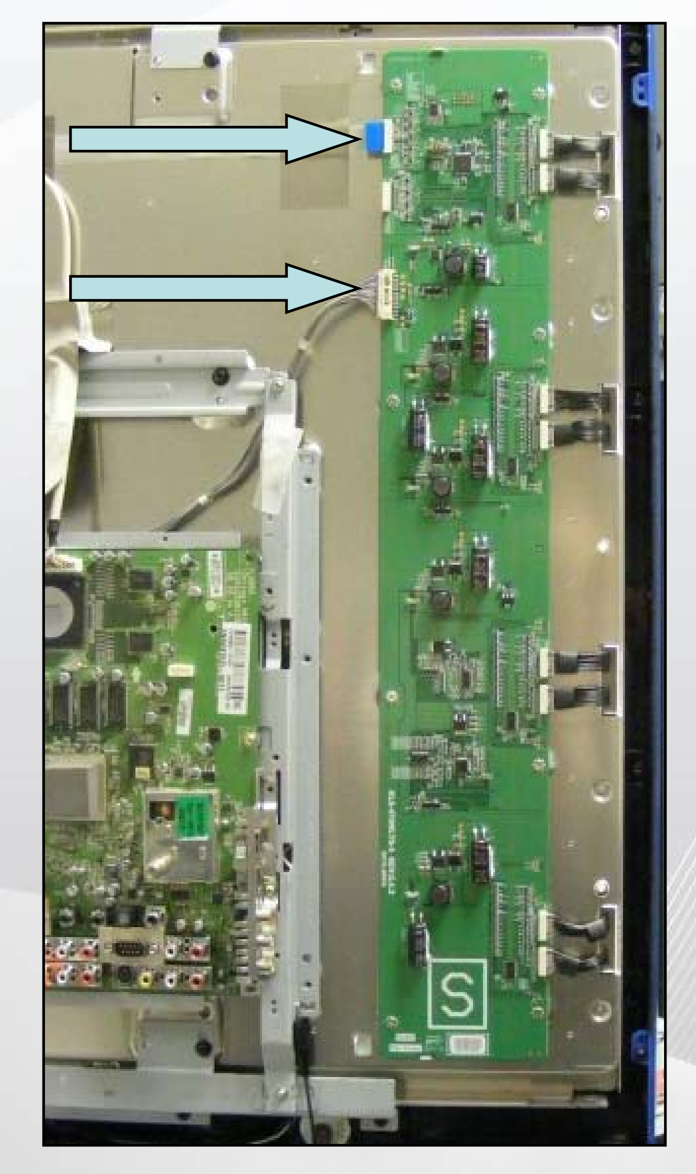
To Backlight LEDs



To T-CON

To SMPS

"S"



To Backlight LEDs



LED BACKLIGHT BASICS

This shows the overall layout of the LEDs used for backlights.

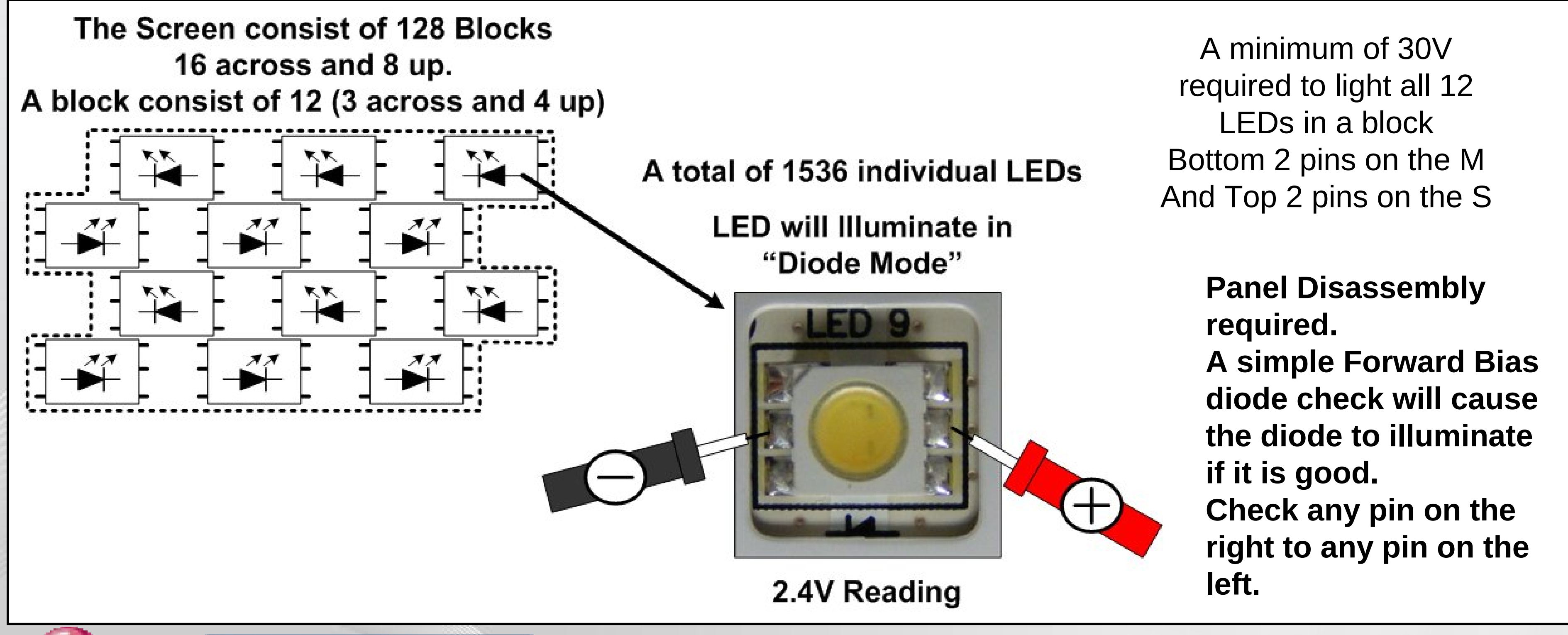
LED BACKLIGHT BASICS (LED Layout)

The picture below shows a close up of one of the 1536 individual LEDs contained within the backlights.

And individual block is manipulated by the T-CON PWB. These blocks are manipulated in accordance with the video intensity at the specific location of the block of LEDs for that video content. In other words, if the video is dark in the area of the screen that is being illuminated by a block of LEDs, they will be dimmed.

Not counting "Black" there are 3 levels of intensity of the LEDs.

The Overall intensity of the backlights is manipulated by the "Global" Dimming signal from the BCM chip called Digital-Dimming.



LED BACKLIGHT BASICS (Local Dimming)

The picture below shows a relationship between the LEDs reaction to real time video on the screen.

A good example shown by A, B, C and D show the dark areas of the screen. As can be seen by the backlight LEDs, they are dimmed out in the same area.

(A) (B) (C)

(A) (B) (C)

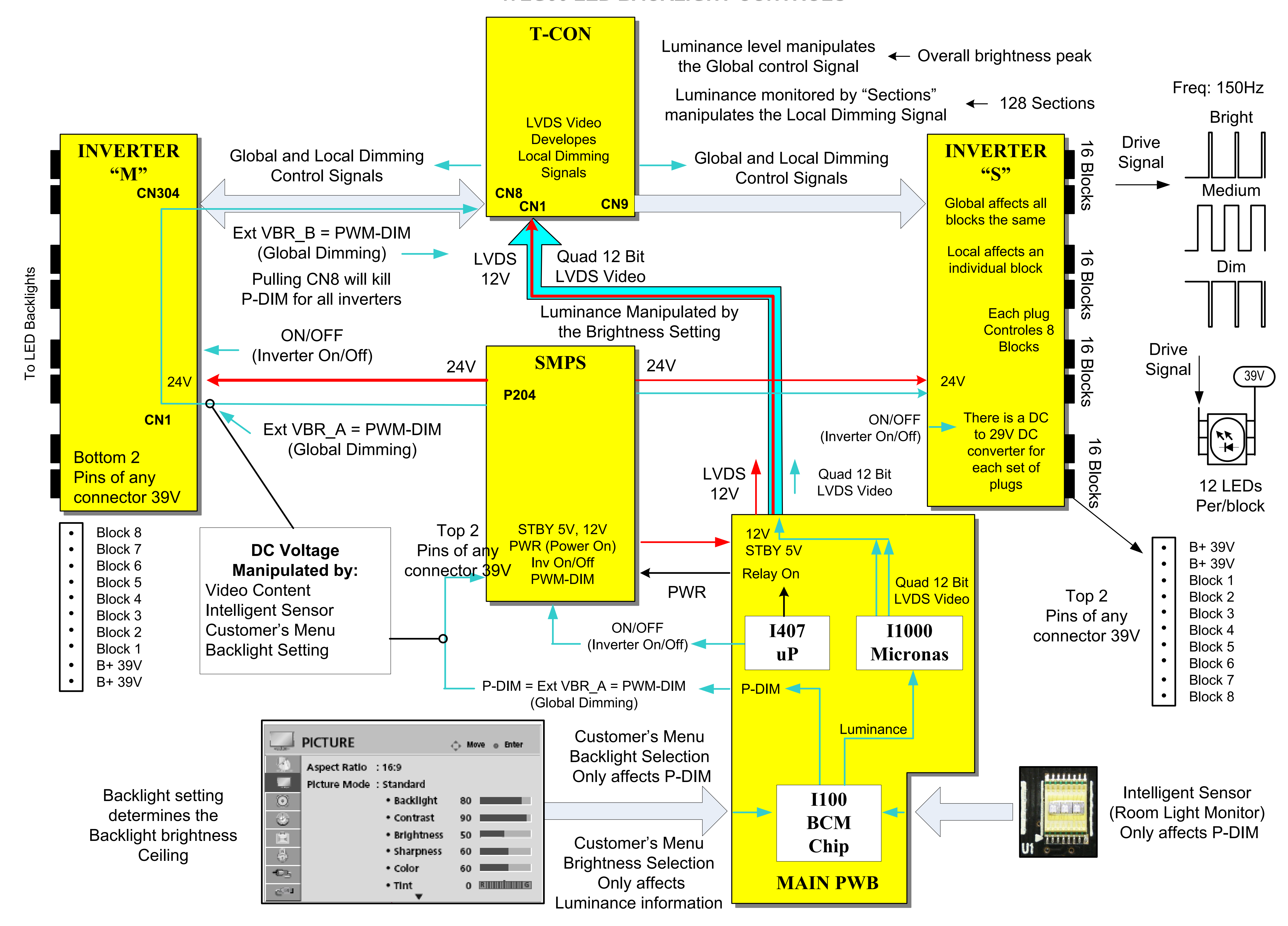
Actual Video capture

Actual LED reaction capture

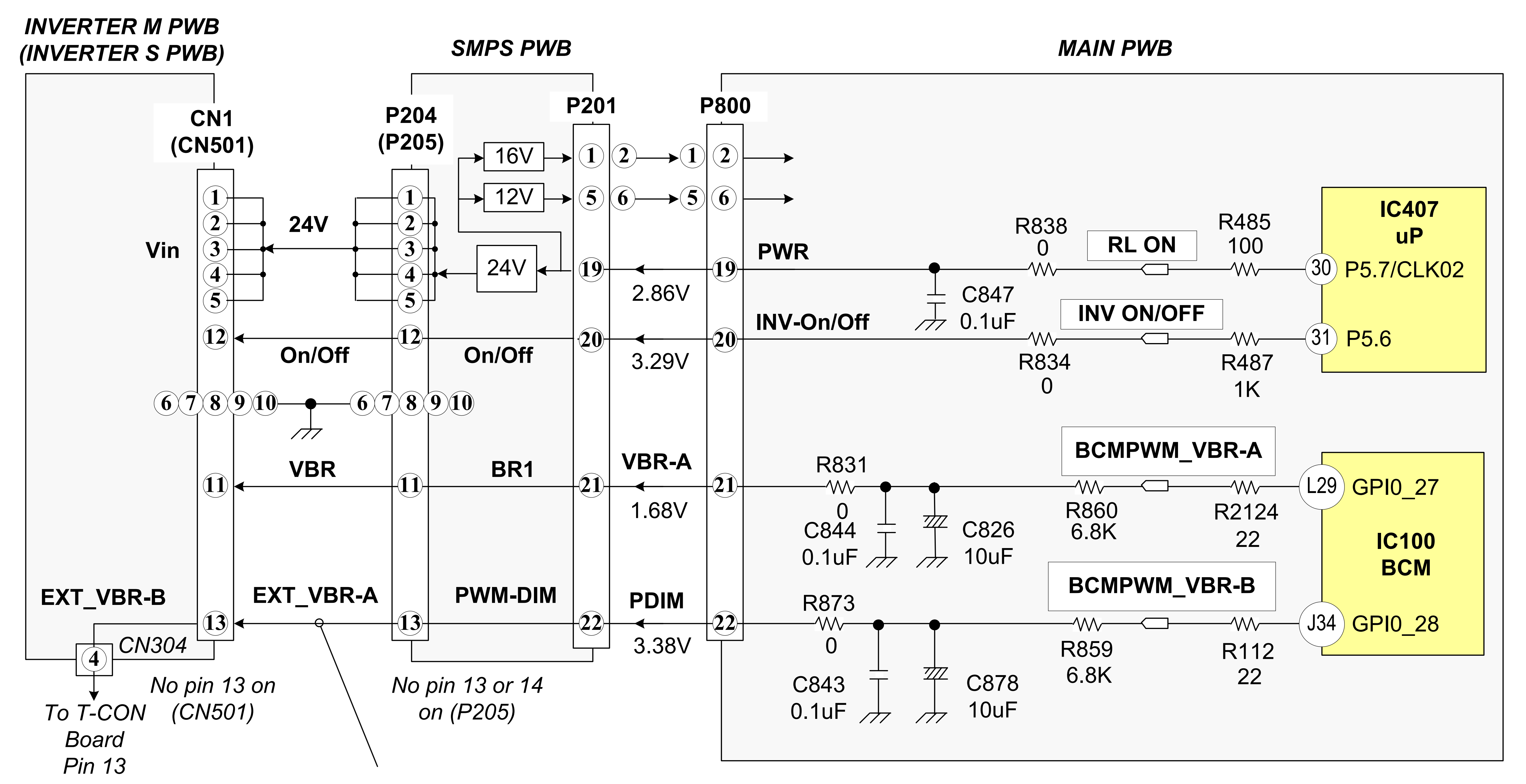
To see a representation of the "Local Dimming" look on the Customer's Menu, turn on Local Dimming Demo.



47LG90 LED BACKLIGHT CONTROLS



47LG90 P800 ON MAIN PWB TO SMPS
GLOBAL LED BACKLIGHT BRIGHTNESS CONTROL CIRCUIT

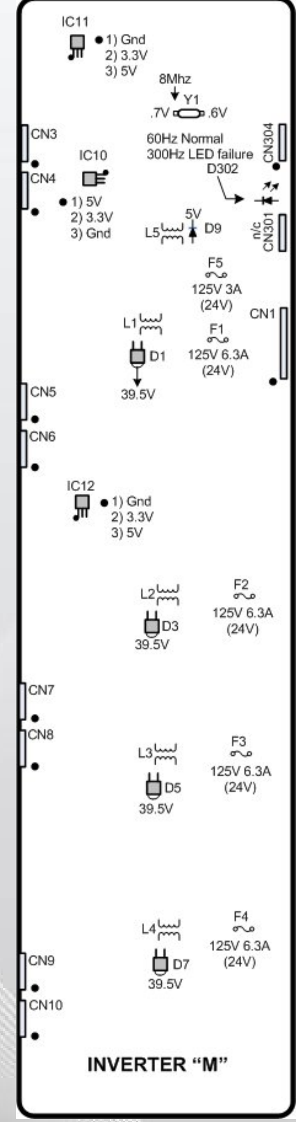


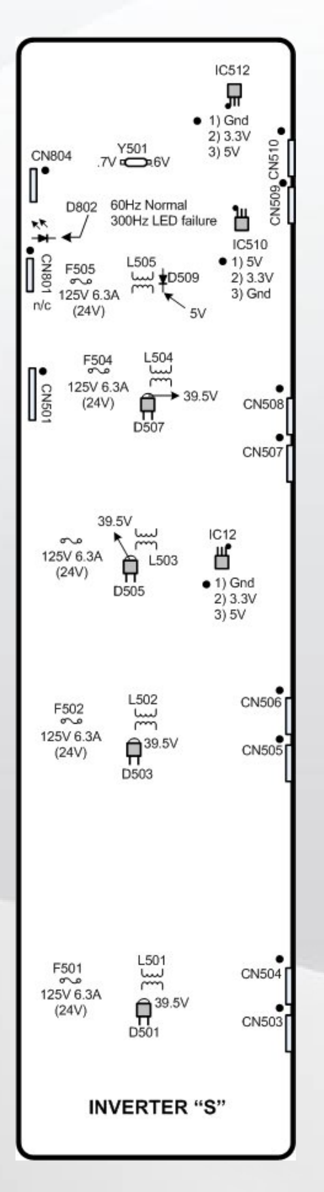
PDIM (PWM Dimming Global control) Manipulates the Backlight Brightness via Customer's OSD. Manipulates the Backlight Brightness via the BCM Chip. Darker Picture, Darker Backlights to facilitate improved Contrast Ratio.
0.3V ~ 3.4V Range.
VBR-B, PDIM, PWM-DIM, EXT_VBR-A all have the same meaning.

BR1 (Analog Dimming) Fixed Voltage.
VBR-A, BR1, VBR all have the same meaning.

INVERTERS M and S TROUBLESHOOTING (Component Identification)

The following section gives voltage test for fuses and DC to DC converters







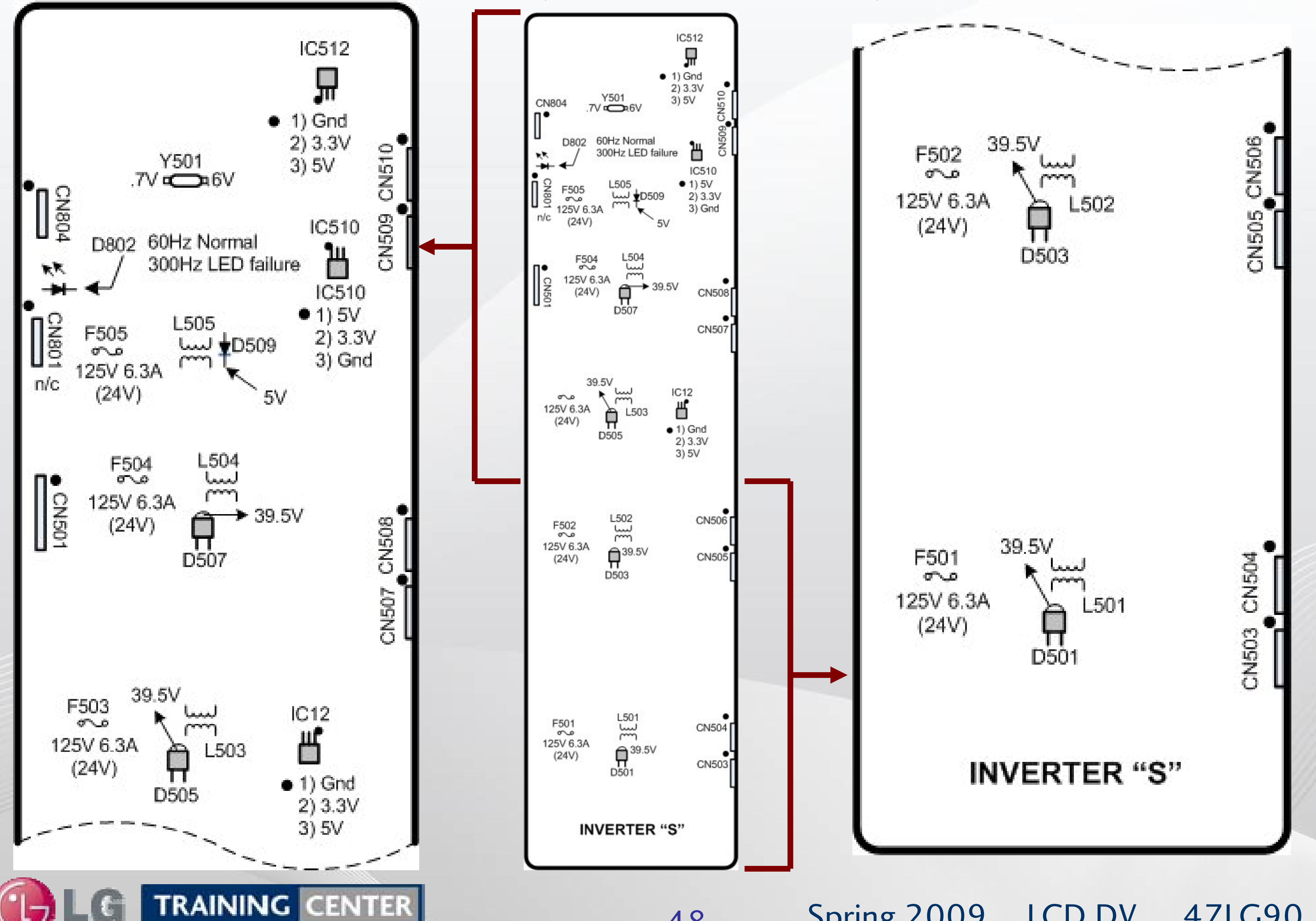
INVERTER M TROUBLESHOOTING (Component Voltages)

IC11
1) Gnd
2) 3.3V
3) 5V
8Mhz
Y1
.7V .6V
60Hz Normal
300Hz LED failure
D302
CN304
CN3
CN4
IC10
1) 5V
2) 3.3V
3) Gnd
L5
5V
D9
n/c
CN301
F5
125V 3A
(24V)
L1
D1
39.5V
F1
125V 6.3A
(24V)
CN1
CN5
CN6
IC12
1) Gnd
2) 3.3V
3) 5V

IC11
1) Gnd
2) 3.3V
3) 5V
8Mhz
Y1
.7V .6V
60Hz Normal
300Hz LED failure
D302
CN304
CN3
CN4
IC10
1) 5V
2) 3.3V
3) Gnd
L5
5V
D9
n/c
CN301
F5
125V 3A
(24V)
CN1
L1
D1
39.5V
F1
125V 6.3A
(24V)
CN5
CN6
IC12
1) Gnd
2) 3.3V
3) 5V
L2
D3
39.5V
F2
125V 6.3A
(24V)
CN7
CN8
L3
D5
39.5V
F3
125V 6.3A
(24V)
CN9
CN10
L4
D7
39.5V
F4
125V 6.3A
(24V)
INVERTER "M"

L2
D3
39.5V
F2
125V 6.3A
(24V)
CN7
CN8
L3
D5
39.5V
F3
125V 6.3A
(24V)
L4
D7
39.5V
F4
125V 6.3A
(24V)
CN9
CN10
INVERTER "M"

INVERTER S TROUBLESHOOTING (Component Voltages)



INVERTER S TROUBLESHOOTING (Checking Crystals Y1 and Y501)

Inverter M

IC11
- 1) Gnd
- 2) 3.3V
- 3) 5V

Y1
.7V .6
8Mhz

CN3
CN4

IC10
- 1) 5V
- 2) 3.3V
- 3) Gnd

5V
L5 D9

CN304
n/c CN301

F5
125V 3A
(24V)

L1
D1
39.5V

F1
125V 6.3A
(24V)

CN1

CN5
CN6

IC12
- 1) Gnd
- 2) 3.3V
- 3) 5V

20mV **50nSec** **8Mhz**

Inverter S

IC512
- 1) Gnd
- 2) 3.3V
- 3) 5V

Y501
6V

CN510
CN509

CN804

IC510
- 1) 5V
- 2) 3.3V
- 3) Gnd

CN801
n/c

F505
125V 6.3A
(24V)

L505
D509
5V

CN501

F504
125V 6.3A
(24V)

L504
39.5V
D507

CN508
CN507

F503
125V 6.3A
(24V)

39.5V
L503
D505

IC12
- 1) Gnd
- 2) 3.3V
- 3) 5V



INVERTER S TROUBLESHOOTING (D302 / D802 Explanation)

Inverter M Top

IC11
1) Gnd
2) 3.3V
3) 5V
8Mhz
Y1
.7V .6V
60Hz Normal
300Hz LED failure
D302
IC10
1) 5V
2) 3.3V
3) Gnd
5V
L5 D9
F5
125V 3A
(24V)
L1
F1
125V 6.3A
(24V)
D1
39.5V
IC12
1) Gnd
2) 3.3V
3) 5V
CN3 CN4 CN304 n/c CN301 CN1 CN5 CN6

CN304

Y1

D302

CN804

Y501

D802

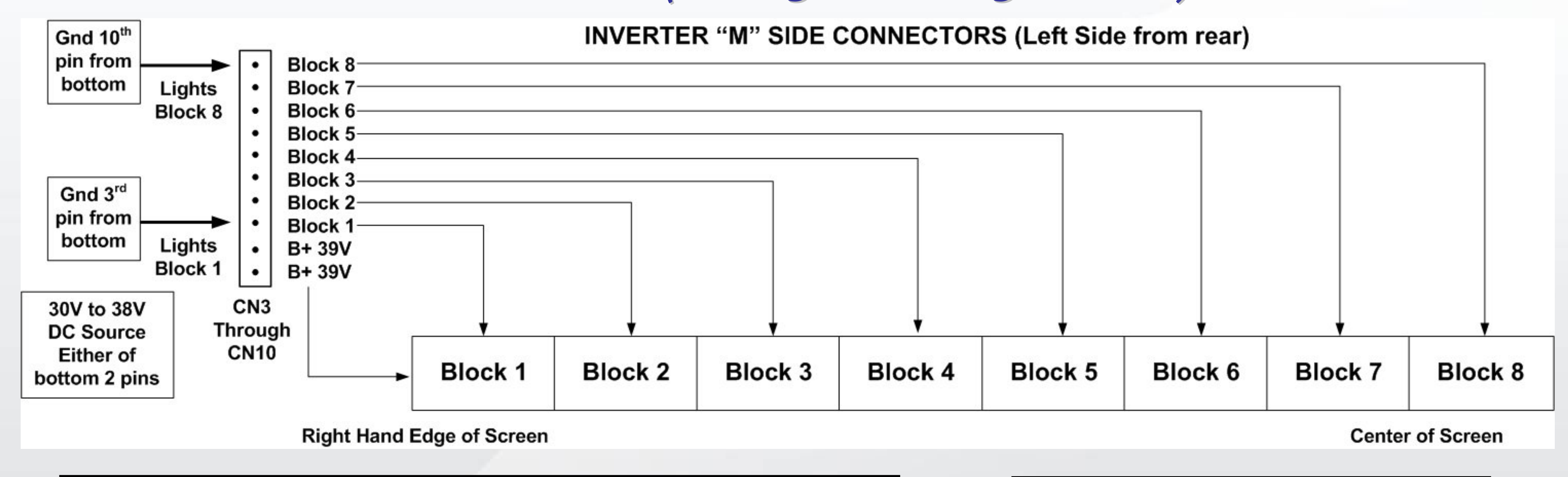
Inverter S Top

IC512
1) Gnd
2) 3.3V
3) 5V
Y501
.7V 6V
D802 60Hz Normal
300Hz LED failure
IC510
IC510
1) 5V
2) 3.3V
3) Gnd
F505
125V 6.3A
(24V)
L505
D509
5V
n/c
F504
125V 6.3A
(24V)
L504
39.5V
D507
F503
125V 6.3A
(24V)
39.5V
L503
D505
IC12
1) Gnd
2) 3.3V
3) 5V
CN804 CN801 CN501 CN510 CN509 CN508 CN507

D302 and D802 are LED visual indicators about the condition of the Inverters. If the inverters and backlight LEDs are running normal, these LEDs will be blinking at a rate of 1Hz. However, if there is an abnormality with the LED drives, they will blink 5 times faster or 5 Hz.

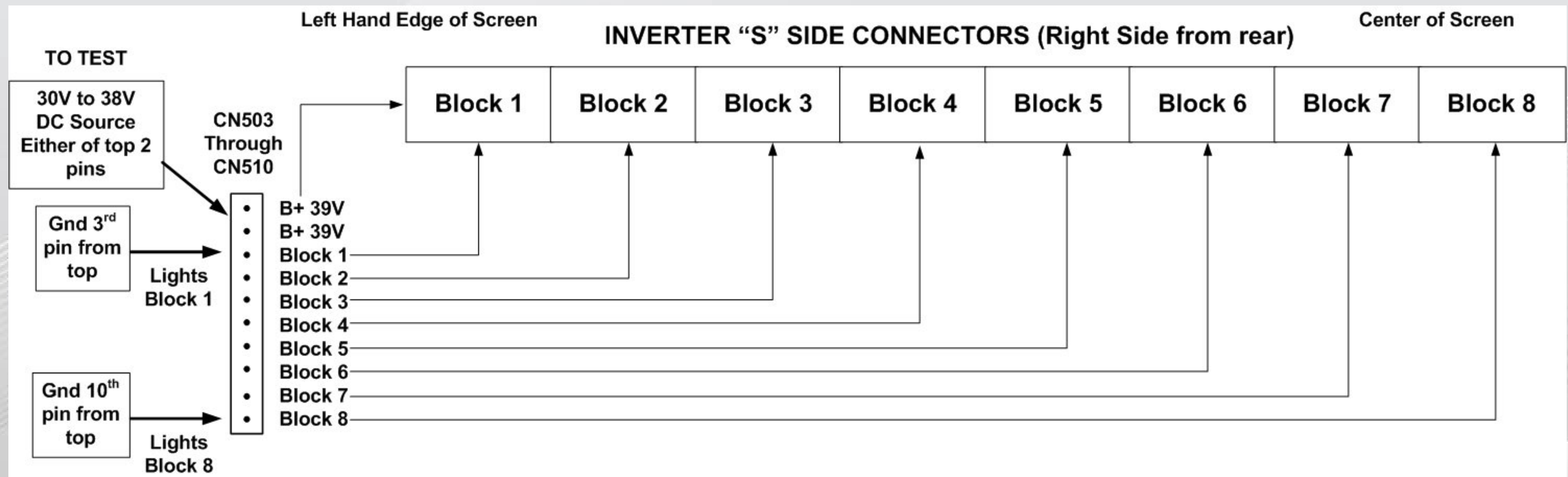


INVERTER S TROUBLESHOOTING (Testing the Backlight Blocks)



UNPLUG THE CONNECTOR FROM THE PWB BEFORE TESTING

There are 8 connectors per/Inverter



LED Backlight Troubleshooting Suggestions

When dealing with the LED backlights that have a problem: Remember, the LED backlights are controlled by two inverters, so the screen is broken down into two sections. Then each inverter controls 8 sections of ½ the screen.

ENTIRE PANEL WON'T LIGHT:

1) Is the 24V being supplied to the Inverters from the SMPS? (CN1/CN501 Pins 1 ~ 5)
2) Is the Inverter On Command arriving at both Inverters? (CN1/CN501 Pin 12) (Main to SMPS P201 Pin 20)
3) Disconnect the ribbon cables from the T-CON PWB to the Inverters, if backlights turn on, could be a T-CON problem.

½ THE PANEL WON'T LIGHT:

1) Confirm steps 1 and 2 above for the particular Inverter involved.
2) Disconnect the ribbon cable from the T-CON PWB going to the particular Inverter involved, could be a T-CON problem. (CN8/CN9)

SECTIONS OF ½ THE PANEL WON'T LIGHT:

1) Locating the connectors controlling that particular section should be easy, just compare the section that is out and align with the particular cable.
2) Looking at the connector going to the LED backlights, look at the bottom 2 pins on the M inverter or the top 2 pins of the S inverter, check for 39V? If missing, unplug the connector and recheck. If still missing, continue;
3) Using the Interconnect diagram, locate the fuse protecting the 24V to the DC to DC converter that's developing the 39V for that connector, if open replace the inverter.
4) Be sure to test the Backlight LEDs that attach to that connector for shorted condition. With the connector unplugged, put the Red lead on the bottom 2 pins on the M inverter or the top 2 pins of the S inverter and the Black lead on any other 8 pins. All should read open. Or apply 30~38V on the bottom 2 pins on the M inverter or the top 2 pins of the S inverter and the (-) lead to any of the other 8 pins while observing that section of the panel, the LEDs should illuminate across the screen in the section controlled by that plug.

ENTIRE PANEL BACKLIGHTS ARE DIM:

1) Disconnect the ribbon cables from the T-CON PWB to the Inverters, could be a T-CON problem. (CN8/CN9)



Inverter "M" Connector CN1 Voltage and Resistance

Diode Mode values taken with all Connectors Removed

CN1 "INVERTER M" to P204 "SMPS"				
Pin	Label	STBY	Run	Diode Check
1	24V (Vin)	0V	24.6V	0.48V
2	24V (Vin)	0V	24.6V	0.48V
3	24V (Vin)	0V	24.6V	0.48V
4	24V (Vin)	0V	24.6V	0.48V
5	24V (Vin)	0V	24.6V	0.48V
6	Gnd	Gnd	Gnd	Gnd
7	Gnd	Gnd	Gnd	Gnd
8	Gnd	Gnd	Gnd	Gnd
9	Gnd	Gnd	Gnd	Gnd
10	Gnd	Gnd	Gnd	Gnd
11	[1]BRI	0V	1.7V	Open
12	On/Off	0V	3.2V	0.83V
13	[2]Ext_VBRA	0V	3.4V	0.53V
14	Gnd	Gnd	Gnd	Gnd

[1]BR1 (ADIM Pin 11) Fixed and not used

[2]Ext_VBRA (PDIM Pin 13) can vary according to type of signal being processed, OSD Backlight setting. 0.9V 0% to 3.4V 100% and the Intelligent Sensor. Output from the BCM chip.



Inverters "M" & "S" Connectors CN304/CN804 Voltage and Resistance

CN304 INVERTER "M" to CN8 "T-CON"				
Pin	**Label**	**STBY**	**Run**	**Diode Check**
1	Gnd	Gnd	Gnd	Gnd
2	Gnd	Gnd	Gnd	Gnd
3	Gnd	Gnd	Gnd	Gnd
4	[1]EXT_VBRB	0V	1.3V	Open
5	Gnd	Gnd	Gnd	Gnd
6	AFLC_SPI_EN	0V	0.1V	1.0V
7	AFLC_DET	0V	0V	1.1V
8	VBR_LAT	0V	0V	Open
9	VBR_SIN	0V	0V	Open
10	VBR_SCLK	0V	0V	Open
11	DRV_XLATO	0V	0V	1.0V
12	n/c	n/c	n/c	Open
13	DRV_SIN0	0V	1V	1.0V
14	DRV_SCLK0	0V	1V	1.0V
15	DRV_BLK0	0V	0V	0.9V
16	DRV_GSCLK0	0V	1.7V	0.9V

CN804 INVERTER "S" to CN9 "T-CON"				
Pin	**Label**	**STBY**	**Run**	**Diode Check**
1	Gnd	Gnd	Gnd	Gnd
2	Gnd	Gnd	Gnd	Gnd
3	Gnd	Gnd	Gnd	Gnd
4	n/c	n/c	n/c	Open
5	Gnd	Gnd	Gnd	Gnd
6	AFLC_SPI_EN	0V	0.13V	1.0V
7	AFLC_DET	0V	0V	1.1V
8	VBR_LAT	0V	0V	Open
9	VBR_SIN	0V	0V	Open
10	VBR_SCLK	0V	0V	Open
11	DRV_XLATO	0V	0V	1.0V
12	n/c	n/c	n/c	Open
13	DRV_SIN0	0V	1V	1.0V
14	DRV_SCLK0	0V	1V	1.0V
15	DRV_BLK0	0V	0V	0.9V
16	DRV_GSCLK0	0V	1.7V	0.9V

[1] **EXT_VBRB** can vary according to type of signal being processed, OSD Backlight setting. 0.3V 0% to 3.4V 100% and the Intelligent Sensor. Output controlled from the BCM chip.

Note: T-CON PWB
Pin numbers are opposite.

Diode Mode values taken with all Connectors Removed



Inverter "S" Connector CN501 Voltage and Resistance

CN501 INVERTER "S" to P205 "SMPS"				
Pin	**Label**	**STBY**	**Run**	**Diode Check**
1	24V (Vin)	0V	24.6V	0.48V
2	24V (Vin)	0V	24.6V	0.48V
3	24V (Vin)	0V	24.6V	0.48V
4	24V (Vin)	0V	24.6V	0.48V
5	24V (Vin)	0V	24.6V	0.48V
6	Gnd	Gnd	Gnd	Gnd
7	Gnd	Gnd	Gnd	Gnd
8	Gnd	Gnd	Gnd	Gnd
9	Gnd	Gnd	Gnd	Gnd
10	Gnd	Gnd	Gnd	Gnd
11	*BRI	0V	1.7V	Open
12	On/Off	0V	3.2V	0.83V

*BR1 (ADIM Pin 21) Fixed and not used

Diode Mode values taken with all Connectors Removed

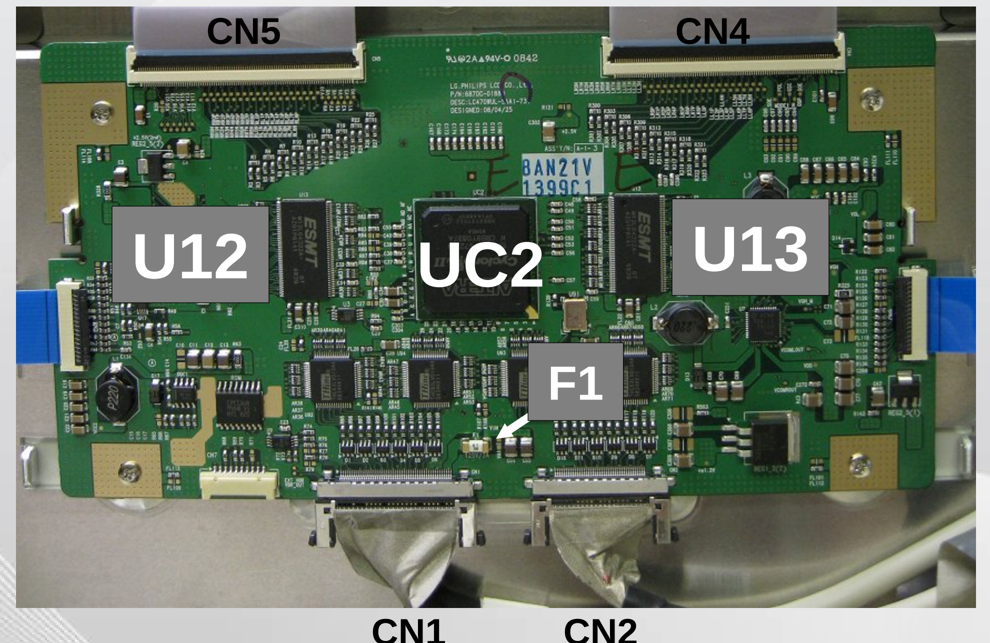


LCD Controller Board

The T-Con IC UC2 receives from the Main Board at CN1 and CN2 Quadruple 12 Bit LVDS Signals which it processes into TFT Drive Signals which through connectors CN4 and CN5 controls the LCD Panel. IC's U12 and U13 are "Dynamic Ram IC's which are High Speed Storage Devices used to store the data until it is time to be addressed. 12V is supplied to the T-Con Board on connector CN1 from the Main Board (easily measured at fuse F1).

NEW: This T-CON also drives the backlight LEDs in accordance to the necessary Light Source intensity according to the video content Contrast Ratio demands, (Local Dimming). Control signals to the Inverters are sent out CN8 and CN9.

Next 2 Slide gives greater layout details



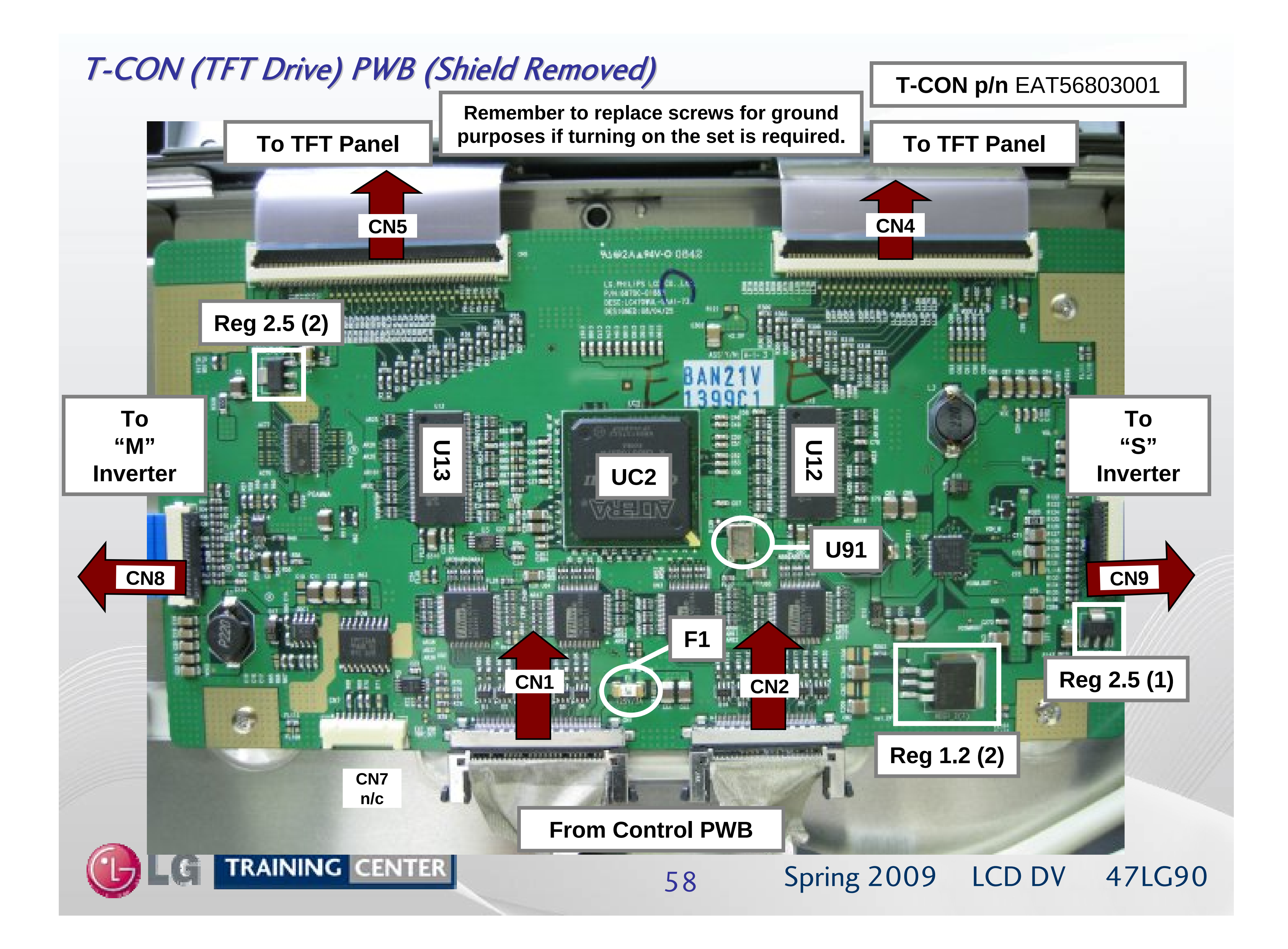
Global Dimming pin 13 (Dig-DIM) input from Inverter M. Controls brightness of LED backlights on both M and S Inverters.

T-CON (TFT DRIVE) PWB WITH SHIELD

To Inverter M

To Inverter S

Two LVDS feeds from Main PWB



T-CON (TFT Drive) PWB (Shield Removed)
T-CON p/n EAT56803001
Remember to replace screws for ground purposes if turning on the set is required.
To TFT Panel
To TFT Panel
CN5
CN4
Reg 2.5 (2)
To "M" Inverter
To "S" Inverter
U13
UC2
U12
U91
CN8
CN9
F1
CN1
CN2
Reg 2.5 (1)
Reg 1.2 (2)
CN7 n/c
From Control PWB
LG TRAINING CENTER

T-CON (TFT Drive) PWB Fuse Checks

Remember to replace screws for ground purposes if turning on the set is required.

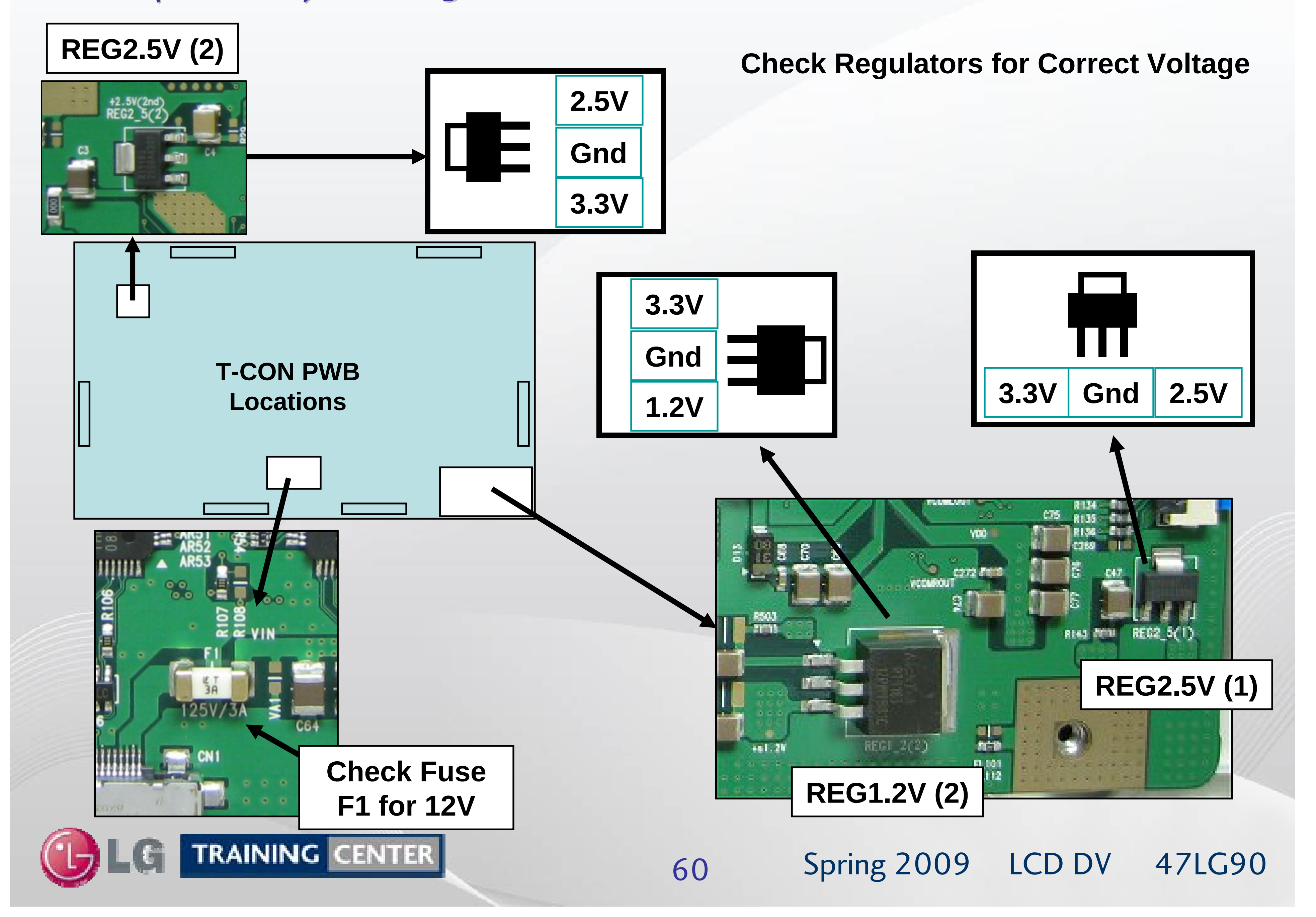
F1 (11.9V)
FL20 (1.6V)
FL21 (3.3V)
FL22 (3.3V)
FL26 (3.3V)
FL27 (3.3V)

Gnd Protect
FL111
FL112
FL113
FL114
FL116
FL118

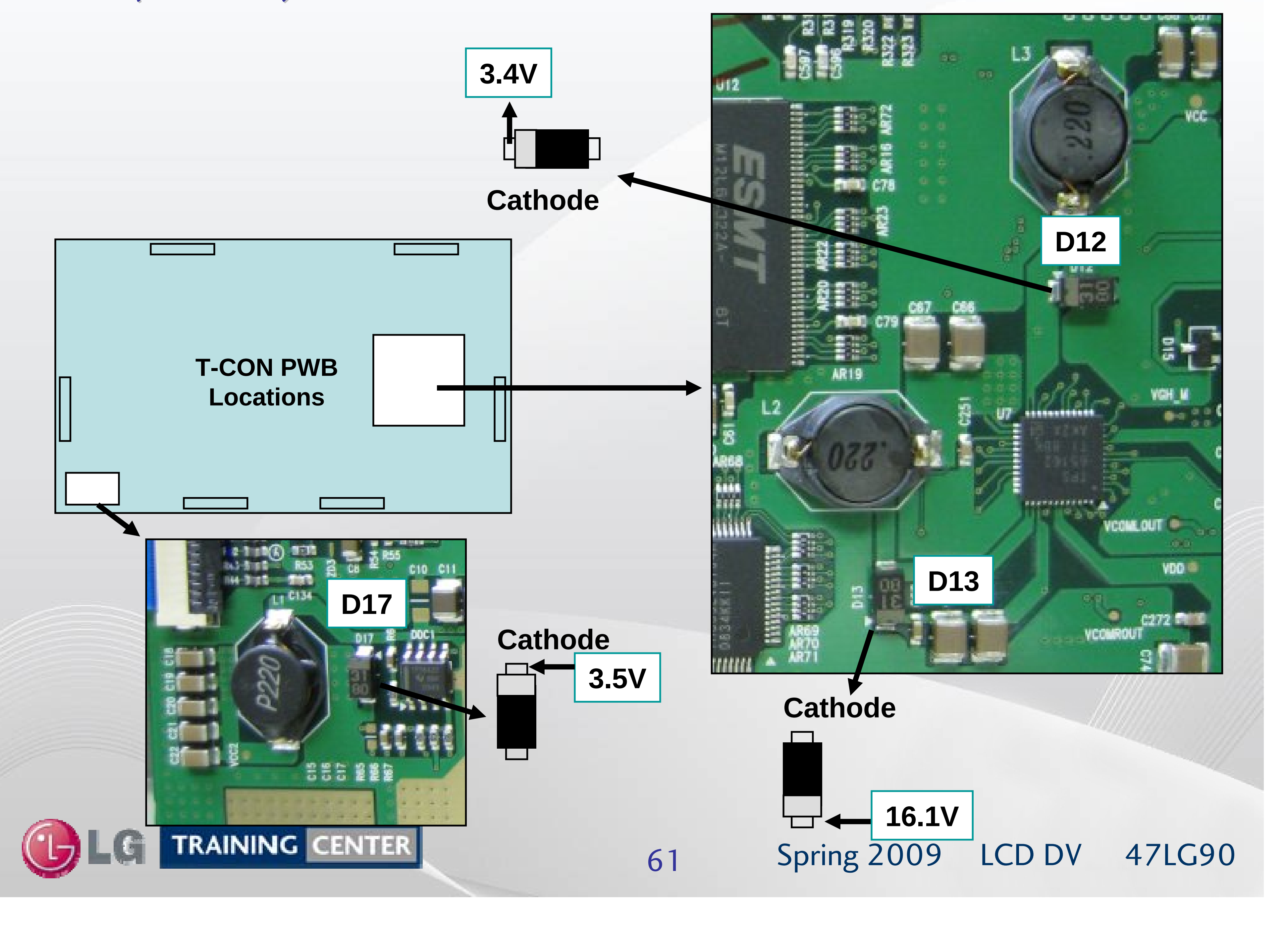
FL111
FL114
FL116
FL21
FL22
FL118
FL20
FL26
FL27
FL113
F1
FL112

T-CON p/n EAT56803001

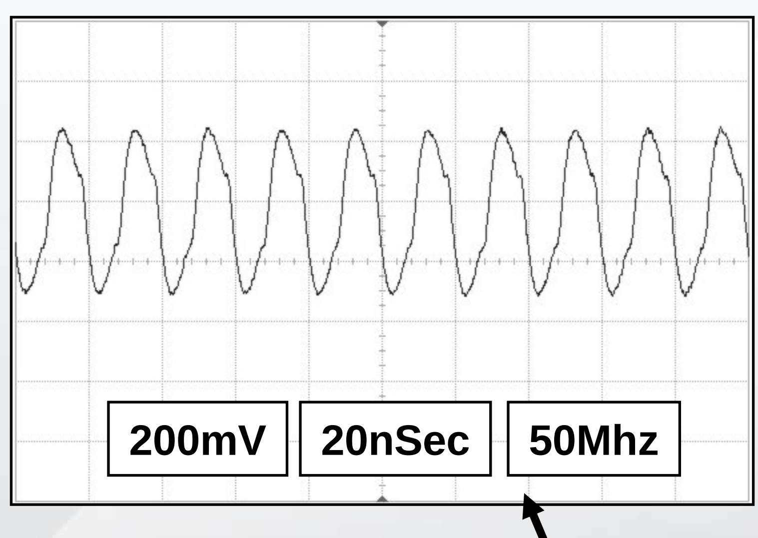
T-CON (TFT Drive) PWB Regulator and Main Fuse Checks



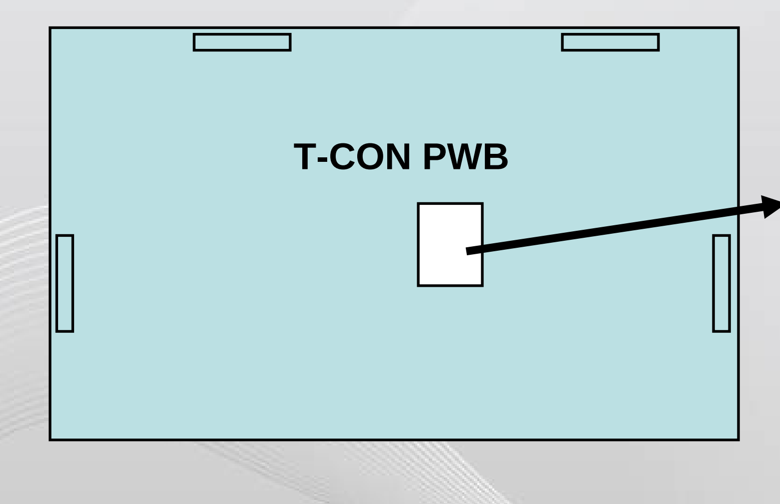
T-CON (TFT Drive) PWB DC to DC Converter Checks

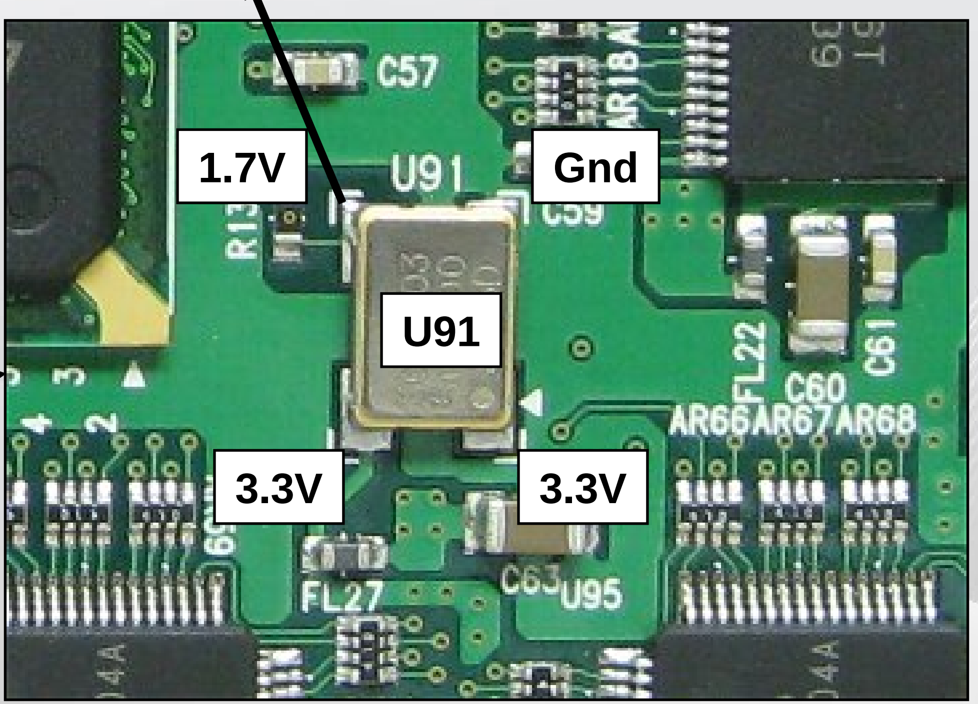


T-CON (TFT Drive) PWB Checks (Crystal U91)



Check the crystal U91







T-CON Connector CN8/CN9 Voltage and Resistance

CN8 T-CON to CN304 INVERTER "M"				
Pin	**Label**	**STBY**	**Run**	**Diode Check**
1	DRV_GSCLK0	0V	1.7V	Open
2	DRV_BLK0	0V	0V	Open
3	DRV_SCLK0	0V	1V	Open
4	DRV_SIN0	0V	1V	Open
5	n/c	Gnd	Gnd	Gnd
6	DRV_XLATO	0V	0V	Open
7	VBR_SCLK	0V	0V	Open
8	VBR_SIN	0V	0V	Open
9	VBR_LAT	0V	0V	Open
10	AFLC_DET	0V	0V	3.1V
11	AFLC_SPI_EN	0V	0.13V	3.1V
12	Gnd	Gnd	Gnd	Gnd
13	[1]EXT_VBRB	0V	0.3/3.4V	Open
14	Gnd	Gnd	Gnd	Gnd
15	Gnd	Gnd	Gnd	Gnd
16	Gnd	Gnd	Gnd	Gnd

CN9 T-CON to CN804 INVERTER "S"				
Pin	**Label**	**STBY**	**Run**	**Diode Check**
1	DRV_GSCLK0	0V	1.7V	Open
2	DRV_BLK0	0V	0V	Open
3	DRV_SCLK0	0V	1V	Open
4	DRV_SIN0	0V	1V	Open
5	n/c	Gnd	Gnd	Gnd
6	DRV_XLATO	0V	0V	Open
7	VBR_SCLK	0V	0V	Open
8	VBR_SIN	0V	0V	Open
9	VBR_LAT	0V	0V	Open
10	AFLC_DET	0V	0V	3.1V
11	AFLC_SPI_EN	0V	0.13V	3.1V
12	Gnd	Gnd	Gnd	Gnd
13	n/c	Gnd	Gnd	Gnd
14	Gnd	Gnd	Gnd	Gnd
15	Gnd	Gnd	Gnd	Gnd
16	Gnd	Gnd	Gnd	Gnd

[1] **EXT_VBRB** can vary according to type of signal being processed, OSD Backlight setting. 0.3V 0% to 3.4V 100% and the Intelligent Sensor. Output controlled from the BCM chip.

Note: Inverter PWBs Pin numbers are opposite.

Diode Mode values taken with all Connectors Removed



Input Signal Processing

The Broadcom or BCM Chip IC100 is the main signal processor and is responsible for :

- ATSC, NTSC, and QAM reception and processing
- RS 232 service only Port (software upgrades and home theater environment).
- Wired Remote Port
- (2) Component Inputs Y, Pr, Pb and Audio L R
- (3) HDMI Inputs (back) (1) HDMI (Side Input)
- RGB PC
- USB (Side Input) (software upgrades using flash drive) and Photos
- AV Composite
- SIF and SAP

Output Signals

- Quadruple 12 Bit LVDS to the T-CON Board
- Audio output signals to the Speakers
- Digital Audio Output Coaxial and Optical
- ON OFF Controls to the SMPS turning on low voltage generation and Backlights
- Backlight intensity control signal (Digital Dimming) used for Global dimming.



Main PWB Micronas IC1000 Chip Overview

The Main PWB contains the **MICRONAS** chip IC1000.
This IC is a Full-HD Rate Converter with Motion Blur Removal and Film De-Juddering for 1080p 100/120 Hz LCD panels.

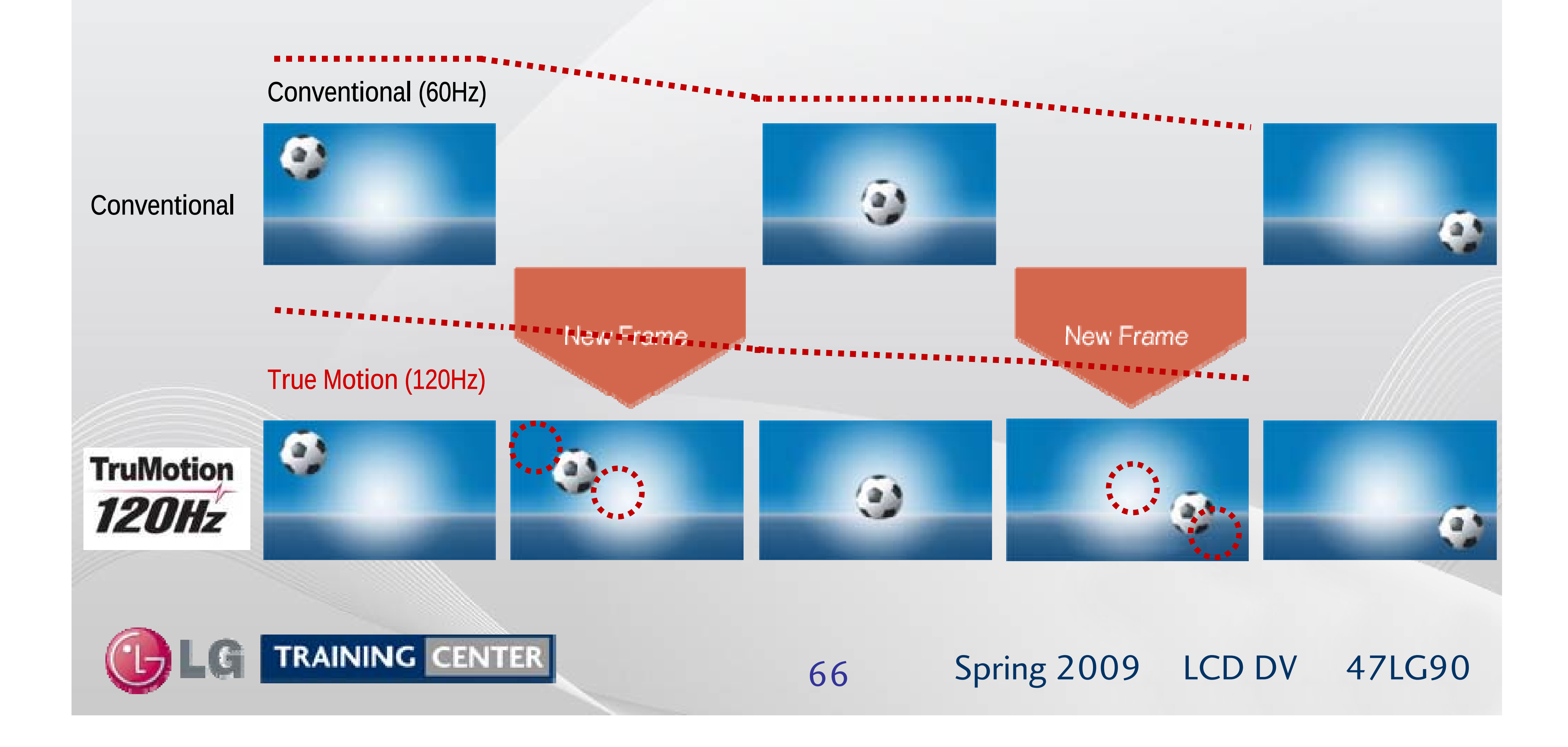
- **Vector Based Motion Compensation with Frame Rate Conversion (eliminates the need for 3:2 Pull Down)**
- **Internal Dual 10 bit LVDS input**
- **Quadruple 12 bit LVDS output**

Motion Blur Removal increases the video frames by Interpolating a new image frame between each original frame (Motion Estimated Data Insertion) **MEDI.**

Juddering is a phenomenon which appears on film based programming due to the 24 frames per second system used for recording, the picture develops visual artifacts when converted to 60 frames per second. 3:2 Pull Down was developed to eliminate this problem. Frame Rate Conversion (Real Cinema) eliminates the need for 3:2 Pull Down.

TruMotion 120Hz (Vector Based Motion Compensation)

TruMotion 120 Hz can reduce blurring on fast moving scenes. TruMotion carefully analyses the picture signal by using advanced algorithms to automatically calculate a new image frame between each original frame (MEDI).





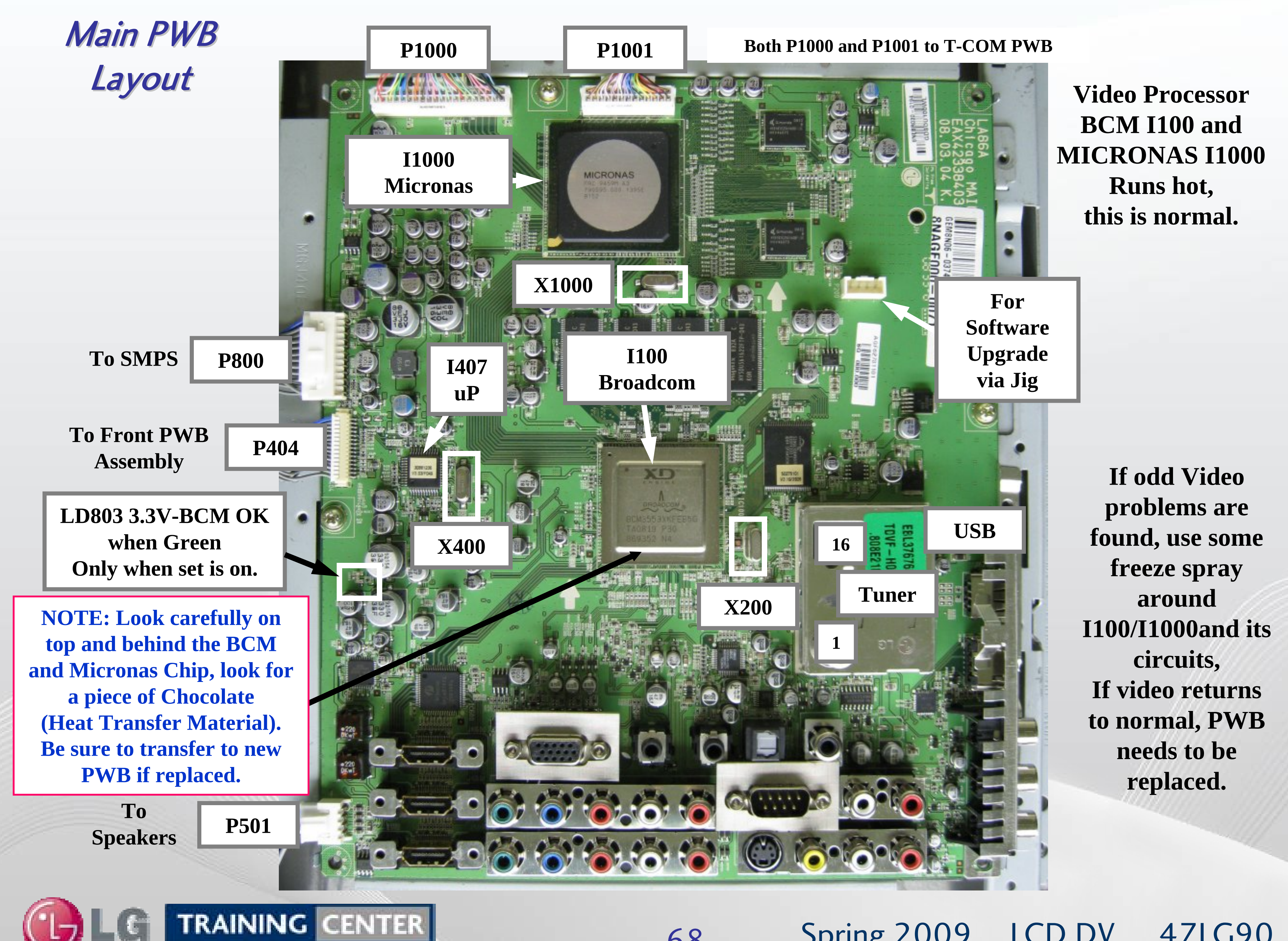
Frame Rate Conversion eliminates the need for 3:2 Pull Down Conversion

Time

An irregular sequence of frames in a movie or video image

	Scene A					Scene B					Scene C				
24P (Film) — 1/24[sec]	A					B					C				
Conventional (60Hz) — 1/60[sec]	A	A	A (Judder)			B	B				C	C	C (Judder)		
5:5 TruCinema (120Hz) — 1/120[sec]	A	A	A	A	A	B	B	B	B	B	C	C	C	C	C

Main PWB Layout



Video Processor BCM I100 and MICRONAS I1000 Runs hot, this is normal.

If odd Video problems are found, use some freeze spray around I100/I1000and its circuits, If video returns to normal, PWB needs to be replaced.

Main PWB Regulators (Front and Back).

Note:
Q900 and Q901
12V LVDS Switch

Voltages for all regulators given on the 11X17 foldout "Interconnect Diagram"

To T-CON PWB

P1000 Pins 1, 2, 3 and 4 carry LVDS 12V when set is on. **P1001**

IC1005
IC1007
Q900
IC1006

Q900
1,3 (12V)
2,4 (6V)
5,8 (12V)
LVDS 12V switch

Q901
LVDS 12V switch control

P800

IC1003
IC1004 IC810

IC1000
True Motion
Micronas

X1000
20.25Mhz

Software Upgrades
P200
n/c

IC812
1 (9V)
2 (3.3V)
3 (5V for Tuner)
4 (n/c)
5 (Gnd)

IC803
1 (12V)
2 (Gnd)
3 (9V)

IC812

IC803

P404

IC407
Micro

X400
24 Mhz
1.5V

IC100
BCM
Broadcom

X200
54 Mhz
1.5V

LD803
Q400 Reset Driver
IC405 Micro Reset

IC405
1 (3.3V)
2 (Gnd)
3 (0V)

IC809
IC805
IC404
IC400

Q803
IC807 IC802
Reset BCM
IC804

16
16 VIF
14 SIF
TUNER
3 (5V)
1

IC501
Audio

Main (Digital) Board

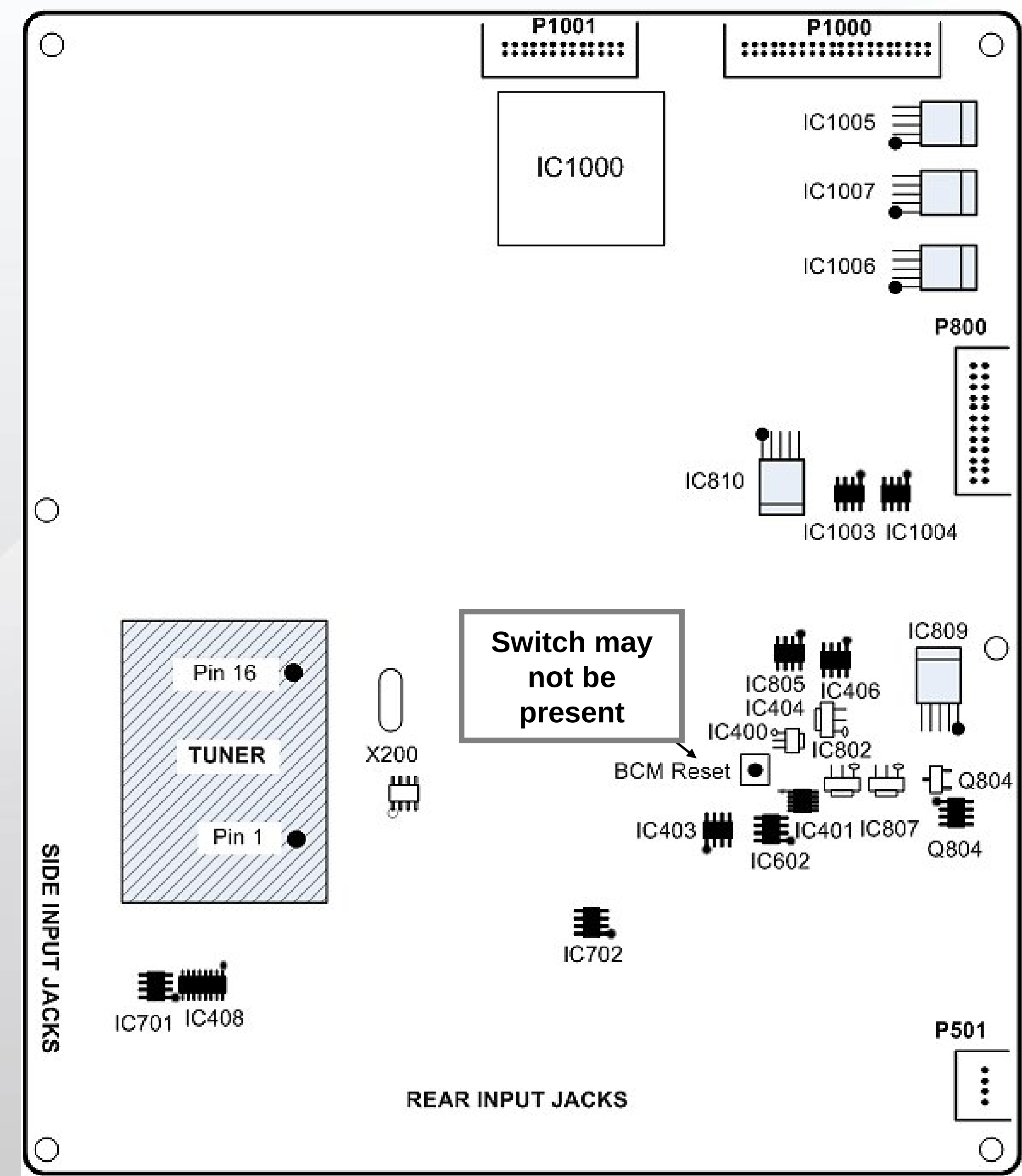
* Grayed Out ICs are located on Back

P501
To Speakers



Main PWB Regulators (Back Side).

Voltages for regulators given on the 11X17 foldout “Interconnect Diagram”



Main PWB (Front Side Regulators)

IC405	STBY	RUN	Label
Function:	Micro Reset control		
Pins 1	0V	3.3V	Input 3.3VST-Micom
Pins 2	Gnd	Gnd	Gnd
Pins 3	0V	0V	Hi then Lo to Q400

Q400	STBY	RUN	Label
Function:	Reset to Micro		
B	0.59V	0.59V	Input from IC405
C	0V	0V	Hi-Lo to IC407 pin 4
E	Gnd	Gnd	Gnd

IC803	STBY	RUN	
Function:	9V Regulator Also source for IC812		
Pins 1	0V	12V	Input
Pins 2	Gnd	Gnd	Gnd
Pins 3	0V	9V	Output

Q900	STBY	RUN	Label
Function:	LVDS Switch		
Pins 1,3	0V	12V	Input
Pins 2,4	0V	6V	On/Off
Pins 5-8	0V	12V	Output LVDS 12V

IC812	STBY	RUN	Label
Function:	5V-TU Regulator		
Pin 1	0V	9V	Input
Pin 2	0V	3.3V	On/Off Power-CTL 3.3V
Pin 3	0V	5V	Output
Pin 4	n/c	n/c	n/c
Pin 5	Gnd	Gnd	Gnd

Q901	STBY	RUN	Label
Function:	Turns on Q900 LVDS Switch		
B	0V	0.7V	LVDS-Panel-Control
C	0V	0V	On low/Off hi
E	0V	0V	Gnd

Main PWB (Back Side Regulators) Slide 1

IC102	STBY	RUN	Label
Function:	EEPROM for HDMI HDCP Key		
Pins 1,2	Gnd	Gnd	Gnd
Pins 3,4	Gnd	Gnd	Gnd
Pin 5	0V	3.78V	SDA
Pin 6	0V	3.78V	SCL
Pin 7	0V	0V	Write Protect
Pin 8	0V	5V	Vcc+5V

IC400	STBY	RUN	Label
Function:	BCM Reset Generator Drives IC401		
Pins 1	0V	3.3V	Input D3.3V-BCM
Pins 2	Gnd	Gnd	Gnd
Pins 3	0V	0V	Hi then Lo to IC401

IC401	STBY	RUN	Label
Function:	BCM Reset Smitt Trigger		
Pin 1	0V	3.3V	Input Reset
Pin 6	0V	3.3V	BCM Reset
Pin 7	Gnd	Gnd	Gnd
Pin 2,3,5	0V	0V	
Pin 14	0V	3.3V	B+ for IC +3.3V
Pins 8,9,10,11,12,13 not used			

Q803	STBY	RUN	Label
Function:	Controls Q804 +5V Switch		
B	0V	0.72V	Input RL-ON
C	5V	0.02V	Output turns on Q804
E	Gnd	Gnd	Gnd

Q804	STBY	RUN	Label
Function:	+5V Switch		
Pins 1,3	0V	5V	Input ST-5V
Pins 2,4	0V	0.3V	On/Off by Q803
Pins 5-8	0V	5V	Output +5V

IC404	STBY	RUN	
Function:	3.3VST-MICON Regulator		
Pins 1	Gnd	Gnd	Gnd
Pins 2	3.3V	3.3V	Output 3.3VST-MICON
Pins 3	5V	5V	Input ST-5V

IC406	STBY	RUN	
Function:	Micro EEPROM		
Pins 1,2,4	Gnd	Gnd	Gnd
Pins 3	3.3V	3.3V	Pull Up
Pin 5	3.3V	3.3V	SDA
Pin 6	3.3V	3.3V	SCL
Pin 7	Gnd	Gnd	Write Protect
Pin 8	3.3V	3.3V	3.3VST-Micom

IC408	STBY	RUN
Pin 1	5V	5V
Pin 2	5V	0.1V
Pin 3,4,5,7	n/c	n/c
Pin 6,8,9	Gnd	Gnd
Pin 10,11	0V	4.78V
Pin 12	0V	0.16V
Pin 13	0V	3.4V
Pin 14	0V	0V
Pin 15	5V	5V
Pin 16	5V	ST-5V

IC602	STBY	RUN
Pin 1	0V	0V
Pin 2	0V	0V
Pin 3	0V	0V
Pin 4	0V	0V
Pin 5	0V	5V
Pin 6	0V	5V
Pin 7	0V	0V
Pin 8	0V	4.8V



Main PWB (Back Side Regulators) Slide 2

IC403	STBY	RUN	Label
Function:	NV RAM-OLD		
Pins 1,2,3	0V	4.9V	Pull Up
Pins 4	Gnd	Gnd	Gnd
Pin 5	0V	3.4V	SDA
Pin 6	0V	3.4V	SCL
Pin 7	0V	0V	Write Protect
Pin 8	0V	5V	Vcc+5V

IC802	STBY	RUN	Label
Function:	3.3V Regulator		
Pins 1	Gnd	Gnd	Gnd
Pins 2	0V	3.3V	Output
Pins 3	0V	5V	Input

IC701	STBY	RUN	
Function:	EEPROM for HDMI		
Pins 1,2	Gnd	Gnd	Gnd
Pins 3,4	Gnd	Gnd	Gnd
Pin 5	0V	5V	SDA
Pin 6	0V	4.7V	SCL
Pin 7	0V	5V	Write Protect
Pin 8	0V	4.73V	Vcc+5V

IC807	STBY	RUN	Label
Function:	1.8V-NTP Regulator		
Pins 1	Gnd	Gnd	Gnd
Pins 2	0V	1.8V	Output
Pins 3	0V	3.3V	Input

IC809	STBY	RUN	Label
Function:	D3.3V Regulator Also Drives LD803		
Pin 1	0V	1.2V	On/Off Power-CTL
Pin 2	0V	5V	Input
Pin 3	Gnd	Gnd	Gnd
Pin 4	0V	3.4V	Output
Pin 5	0V	3.3V	ADJ

IC810	STBY	RUN	Label
Function:	D2.6V Regulator		
Pin 1	0V	2.5V	Input
Pin 2	0V	1.2V	On/Off Power-CTL 2.6V
Pin 3	Gnd	Gnd	Gnd
Pin 4	n/c	3.3V	ADJ
Pin 5	Gnd	5V	Output

IC1003	STBY	RUN
Pin 1	0V	13V
Pin 2	0.68V	0V
Pin 3	0.6V	0V
Pin 4	0V	1.24V
Pin 5	3.3V	3.3V
Pin 6	0V	0V
Pin 7	0V	12V
Pin 8	0V	3.4V

IC1004	STBY	RUN
Pin 1	0V	10V
Pin 2	0.78V	0V
Pin 3	0.7V	0V
Pin 4	0V	1.24V
Pin 5	0V	0V
Pin 6	0V	0V
Pin 7	0V	12V
Pin 8	0V	1.3V

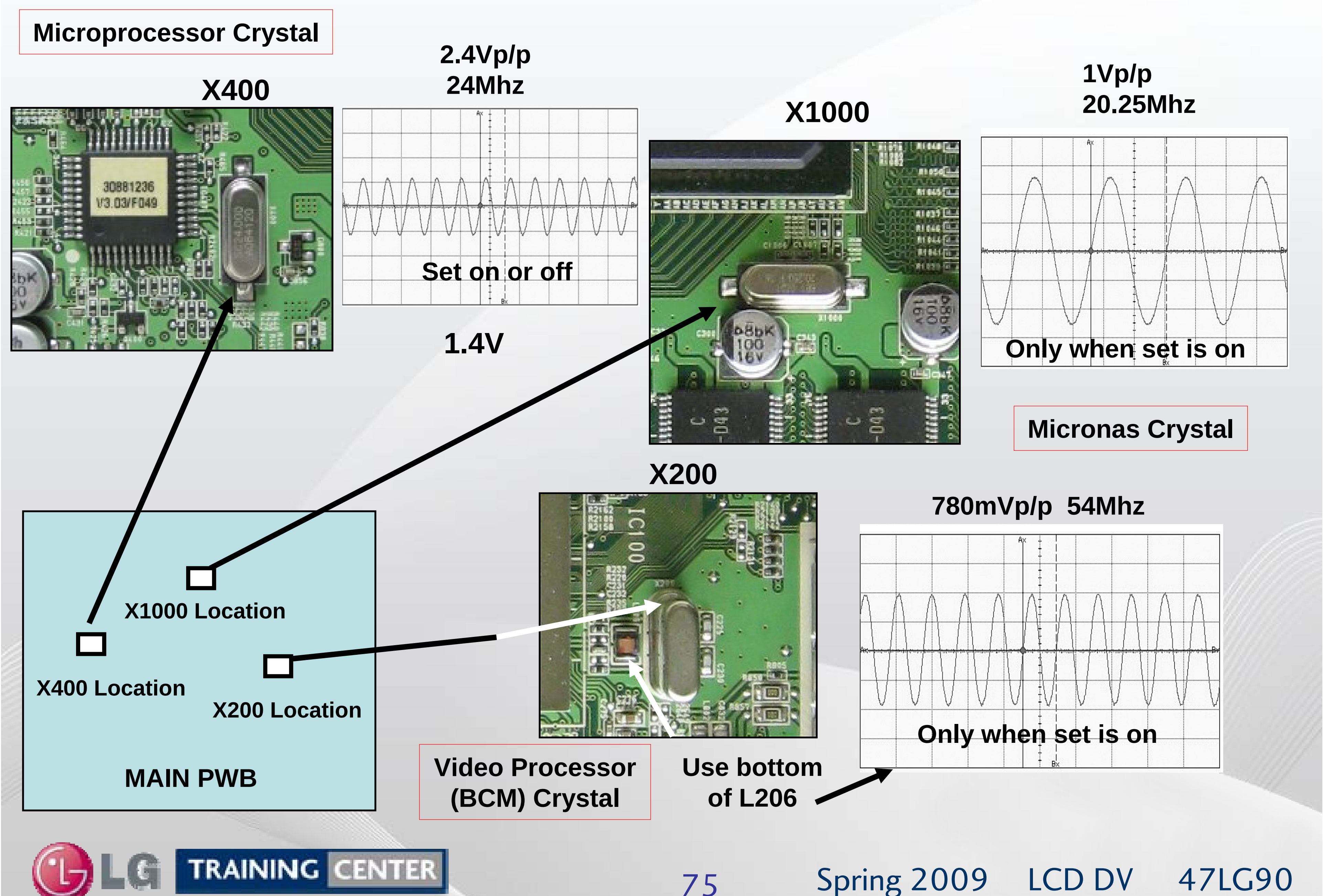


Main PWB (Back Side Regulators) Slide 3

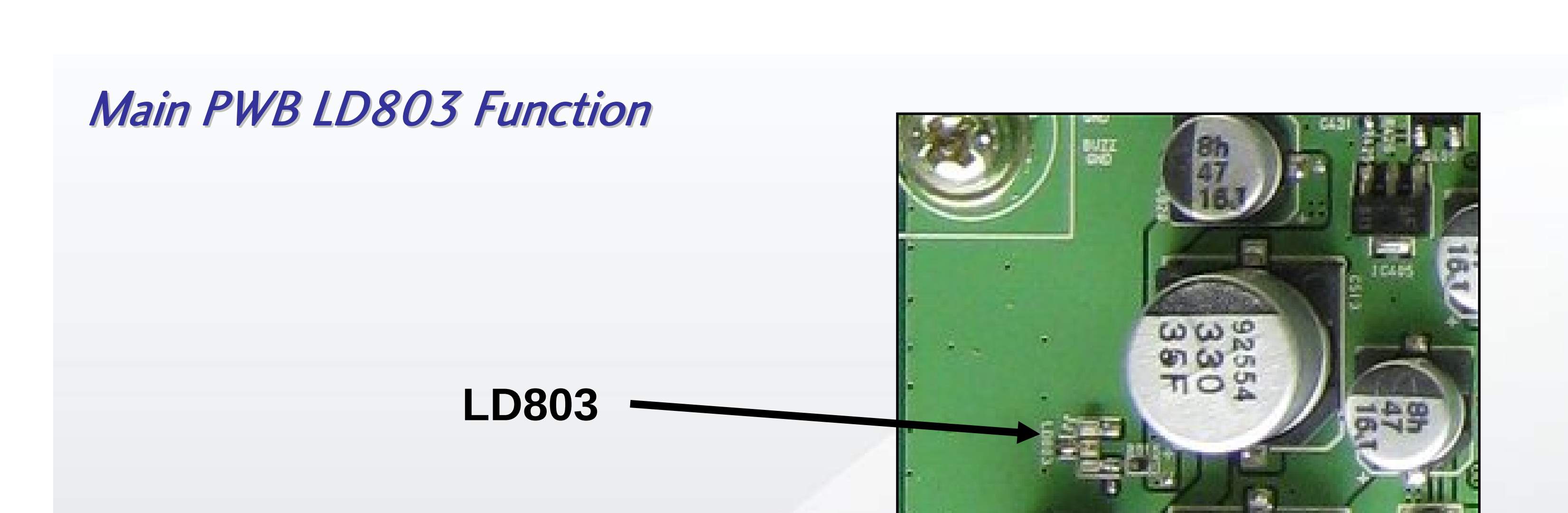
IC702	STBY	RUN	Label
Function:	EEPROM for RS232		
Pins 1,2	Gnd	Gnd	Gnd
Pins 3,4	Gnd	Gnd	Gnd
Pin 5	0V	0.15V	SDA
Pin 6	5V	0.13V	SCL
Pin 7	0V	0.13V	Write Protect
Pin 8	0V	5V	Vcc+5V
IC805	**STBY**	**RUN**	**Label**
Function:	D1.2V-BCM Regulator		
Pin 1	0V	6V	RST
Pin 2	0V	5V	Input
Pin 3	0V	1.2V	Output
Pin 4	0V	0V	Gnd
Pin 5	0V	3.3V	On/Off Power-CTL
Pin 6	0V	1.2V	FB
Pin 7	0V	1V	COMP
Pin 8	0V	0V	Gnd

IC1005	STBY	RUN
Pin 1	0V	0V
Pin 2	0V	3.4V
Pin 3	0V	0V
Pin 4	0V	1.4V
Pin 5	0V	1.2V
IC1006	**STBY**	**RUN**
Pin 1	0V	3.3V
Pin 2	0V	3.3V
Pin 3	0V	0V
Pin 4	0V	1.8V
Pin 5	0V	0V
IC1007	**STBY**	**RUN**
Pin 1	0V	3.3V
Pin 2	0V	3.3V
Pin 3	0V	0V
Pin 4	0V	0V
Pin 5	0V	2.5V

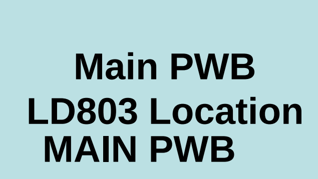



Main PWB X100 X200 and X1000 Check
Microprocessor Crystal
X400
2.4Vp/p
24Mhz
Set on or off
1.4V
X1000
1Vp/p
20.25Mhz
Only when set is on
Micronas Crystal
X200
780mVp/p 54Mhz
Only when set is on
X1000 Location
X400 Location
X200 Location
MAIN PWB
Video Processor
(BCM) Crystal
Use bottom
of L206
LG TRAINING CENTER

Main PWB LD803 Function



LD803



Main PWB
LD803 Location
MAIN PWB

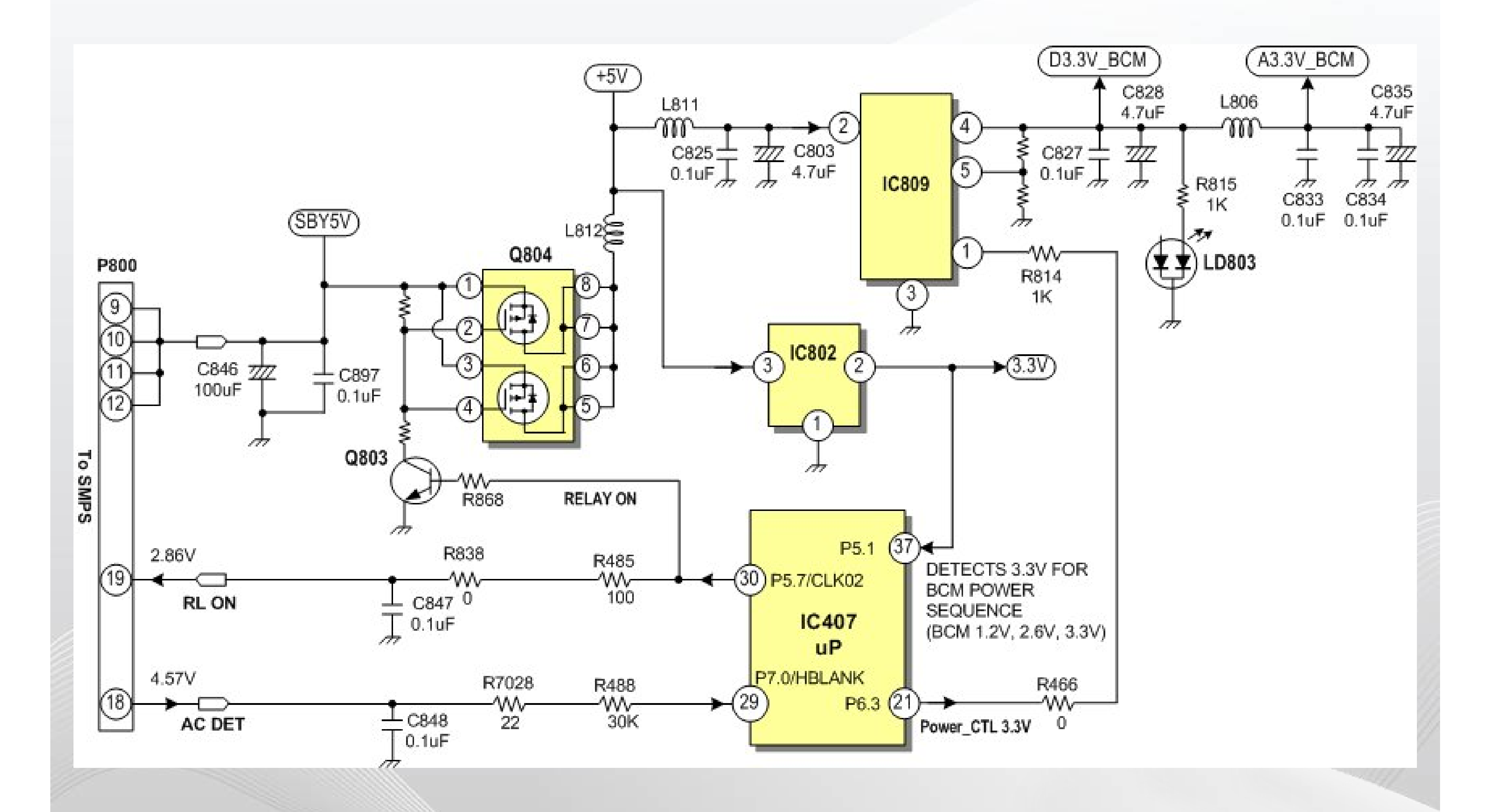
Use LD803 as a visual aid.
This lets you know if the +5V is being converted to 3.3V for the BCM chip IC100.
If LD803 is illuminated GREEN, +3.3V is OK.

Note: Only ½ of the dual LED is used.

Circuit turning on LD803 shown on next slide

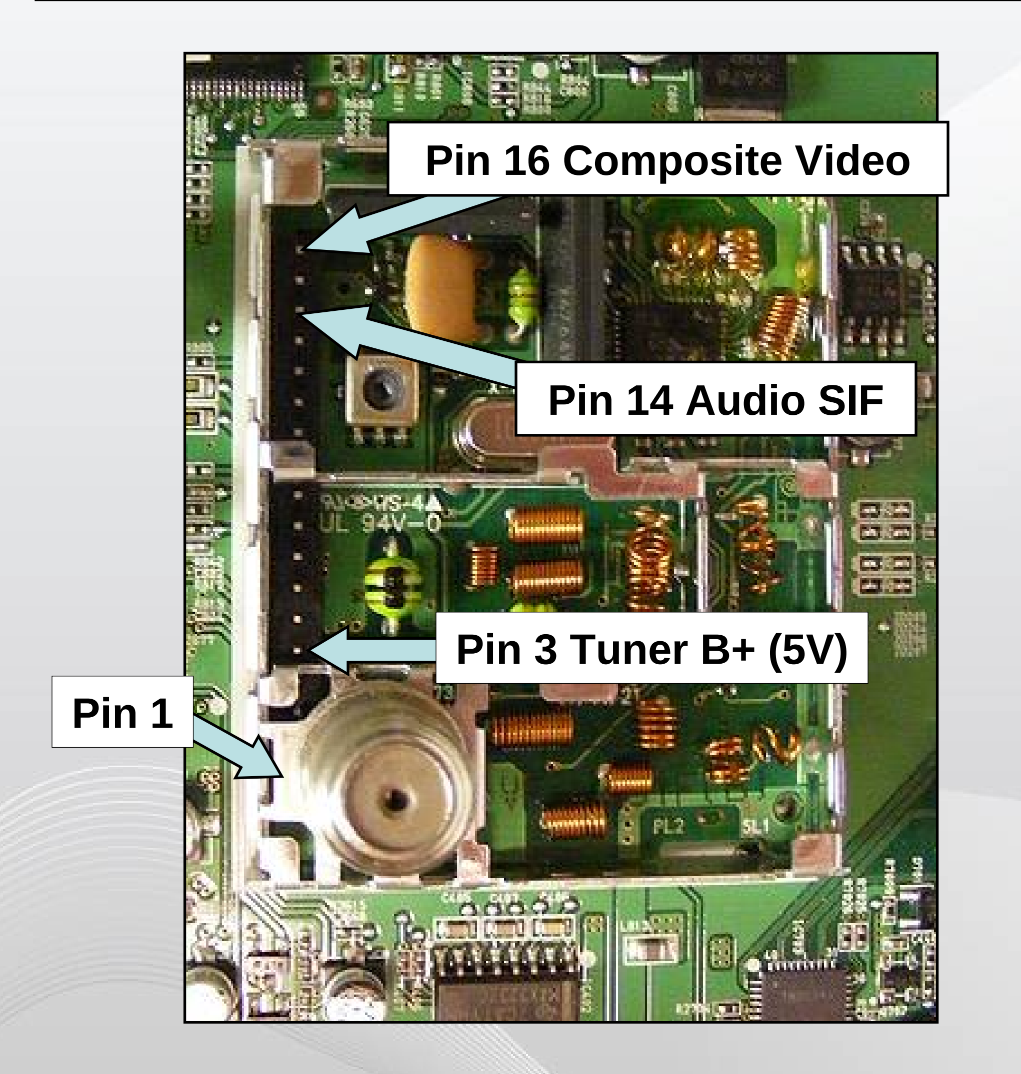


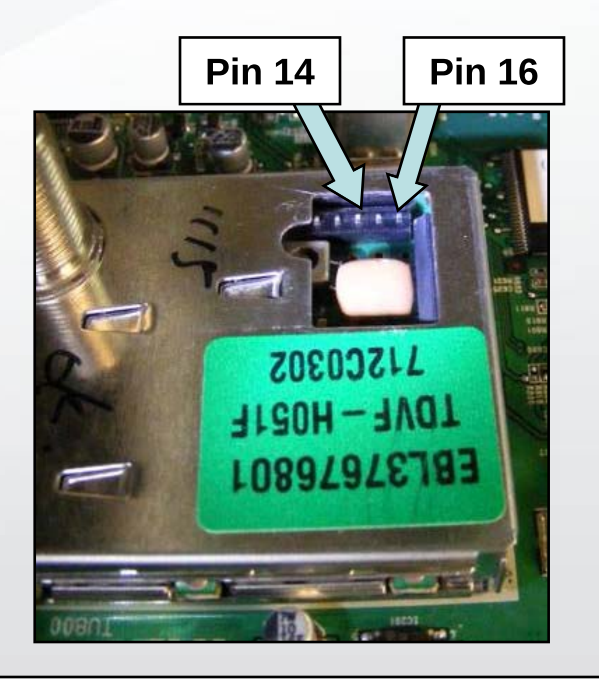
Main PWB LD803 Circuit Details



Main PWB Tuner Video and SIF Output Check Pin Location

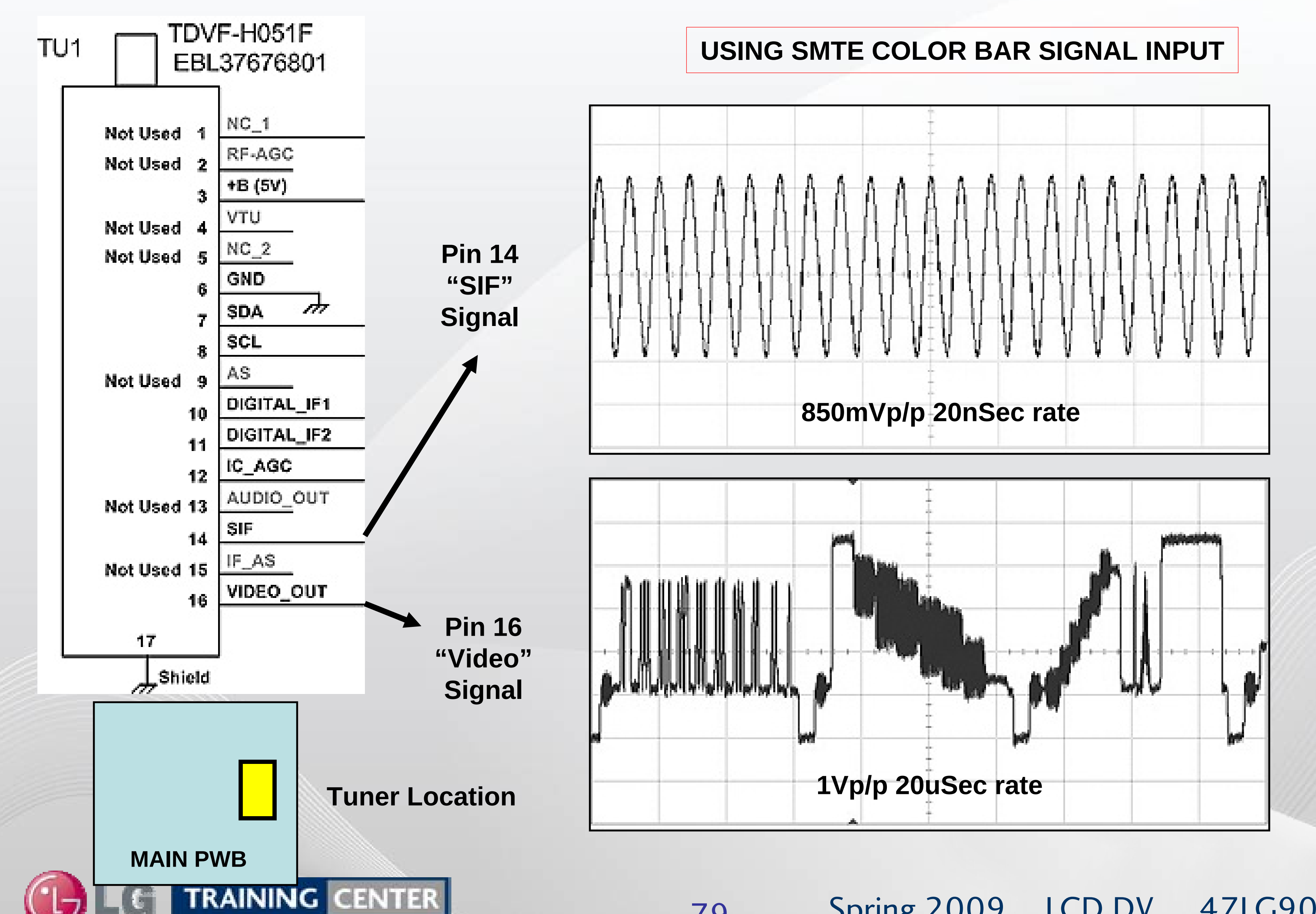
For Easy Access, pop the shield off the tuner





If you leave the shield on you can still access the same pins.
Be careful not to accidentally ground out your test lead on the shield.
(Note: This is a picture from a different model, but the concept is the same)

Main PWB Tuner Video and SIF Output Check



Main PWB LVDS P1000 Output Check

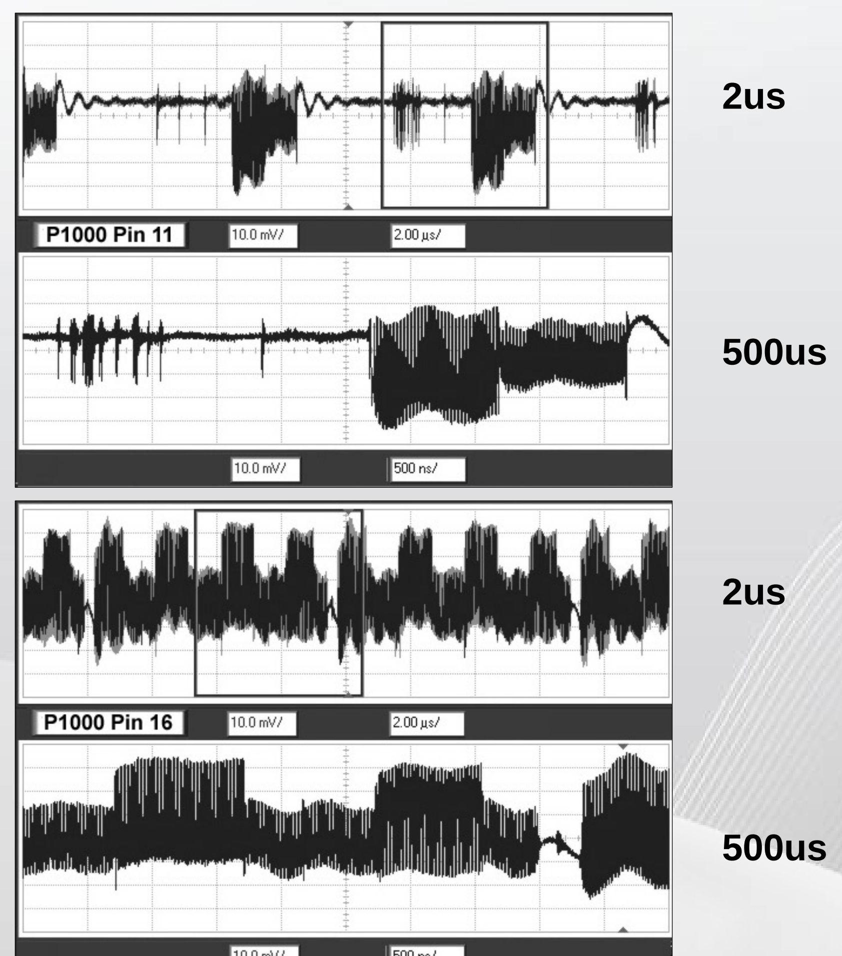
To confirm that the Main PWB is outputting Picture Content signals, check P1000 (LVDS) cable for output. Check pins 11-22 and 27-38. This signals vary from each other, but looking for signals like the ones shown below on any of these pins will confirm the output of video content. This signal is using standard SMTE Color Bar output from a generator as the input source.

P1000 Location

MAIN PWB

Pin 11

Pin 16



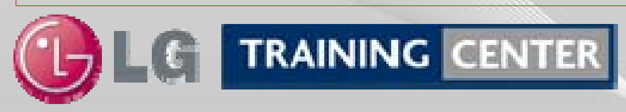
2us

500us

2us

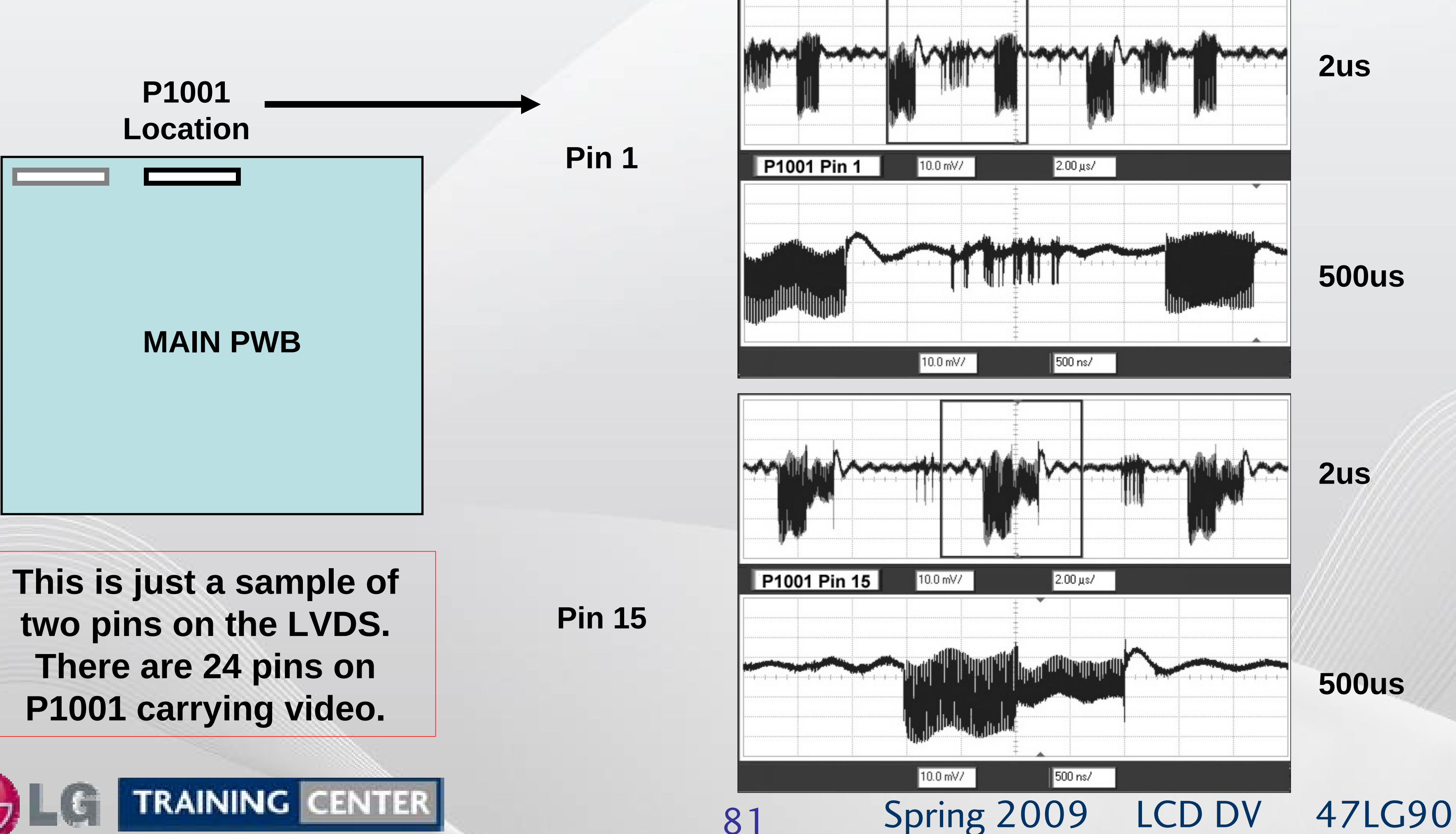
500us

This is just a sample of two pins on the LVDS. There are 24 pins on P1000 carrying video.



Main PWB LVDS P1001 Output Check

To confirm that the Main PWB is outputting Picture Content signals, check P1001 (LVDS) cable for output. Check pins 1-12 and 15-26. This signals vary from each other, but looking for signals like the ones shown below on any of these pins will confirm the output of video content. This signal is using standard SMTE Color Bar output from a generator as the input source.



This is just a sample of two pins on the LVDS. There are 24 pins on P1001 carrying video.

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Main PWB Connector P800 Voltage and Resistance

P800 CONNECTOR "Main" to P201 "SMPS PWB"

Pin 1



Pin	Label	STBY	Run	Diode Check
1	16.5V	0V	16.6V	OL
3	Gnd	Gnd	Gnd	Gnd
5	12V	0V	12V	3.1V
7	Gnd	Gnd	Gnd	Gnd
9	5V	5.1V	5.1V	1.48V
11	5V	5.1V	5.1V	1.48V
13	Gnd	Gnd	Gnd	Gnd
15	Gnd	Gnd	Gnd	Gnd
17	Error	0V	0V	2.86V
19	PWR-On	0V	2.7V	1V
21	*BRI	0V	1.7V	OL
23	n/c	0V	0V	OL

Pin	Label	STBY	Run	Diode Check
2	16.5V	0V	16.6V	OL
4	Gnd	Gnd	Gnd	Gnd
6	12V	0V	12V	3.1V
8	Gnd	Gnd	Gnd	Gnd
10	5V	5.1V	5.1V	1.48V
12	5V	5.1V	5.1V	1.48V
14	Gnd	Gnd	Gnd	Gnd
16	Gnd	Gnd	Gnd	Gnd
18	ACD	5V	5V	OL
20	(INV)On/Off	0V	3.2V	1.89V
22	*PDIM	0V	3.4V	OL
24	n/c	0V	0V	OL

Pin 21 BRI (ADIM) Is Fixed and is not used

[2]**PDIM Pin 22** can vary according to type of signal being processed, OSD Backlight setting. 0.4V 0% to 3.4V 100% and the Intelligent Sensor. Output controlled from the BCM chip.

Diode Mode values taken with all Connectors Removed



Main PWB Connector P1000 "Odd Pins" Voltage and Resistance

P1000 CONNECTOR "Main" Odd Pins to CN1 "T-CON PWB"

Label	Pin	SBY	Run	Diode Check
Switched LVDS 12V	1	0V	12.2V	OL
Switched LVDS 12V	3	0V	12.2V	OL
Gnd	5	0V	0V	Gnd
Gnd	7	0V	0V	Gnd
n/c	9	0.47V	3.3V	OL
Video Signal Pins	**11**	0V	1.14V	1.27V
Video Signal Pins	**13**	0V	1.14V	1.27V
Video Signal Pins	**15**	0V	1.14V	1.27V
Video Signal Pins	**17**	0V	1.13V	1.27V
Video Signal Pins	**19**	0V	1.14V	1.27V
Video Signal Pins	**21**	0V	1.14V	1.27V
Gnd	23	0V	0V	OL
LVDS-SEL	25	0.5V	3.3V	0.66V
Video Signal Pins	**27**	0V	1.4V	1.2V
Video Signal Pins	**29**	0V	1.4V	1.2V
Video Signal Pins	**31**	0V	1.3V	1.2V
Video Signal Pins	**33**	0V	1.2V	1.2V
Video Signal Pins	**35**	0V	1.4V	1.2V
Video Signal Pins	**37**	0V	1.4V	1.2V
AFLC-EN	39	0V	3.3V	OL

Diode Mode values taken with all Connectors Removed

Main PWB Connector P1000 "Even Pins" Voltage and Resistance

P1000 CONNECTOR "Main" Odd Pins to CN1 "T-CON PWB"

Signal	Pin	SBY	Run	Diode Check
Switched LVDS 12V	2	0V	12.2V	OL
Switched LVDS 12V	4	0V	12.2V	OL
Gnd	6	0V	0V	Gnd
Gnd	8	0V	0V	OL
n/c	10	0V	3.1V	OL
Video Signal Pins	**12**	0V	1.1V	1.27V
Video Signal Pins	**14**	0V	1.1V	1.27V
Video Signal Pins	**16**	0V	1.2V	1.27V
Video Signal Pins	**18**	0V	1.3V	1.27V
Video Signal Pins	**20**	0V	1.2V	1.27V
Video Signal Pins	**22**	0V	1.2V	1.27V
Gnd	24	0V	0V	OL
LVDS-SEL	26	0V	0V	OL
Video Signal Pins	**28**	0V	1.2V	1.2V
Video Signal Pins	**30**	0V	1.1V	1.2V
Video Signal Pins	**32**	0V	1.1V	1.2V
Video Signal Pins	**34**	0V	1.2V	1.2V
Video Signal Pins	**36**	0V	1.1V	1.2V
Video Signal Pins	**38**	0V	1.1V	1.2V
AFLC-EN	40	0V	0V	Gnd

Diode Mode values taken with all Connectors Removed



Main PWB Connector P1001 Voltage and Resistance

P1001 “Odd Pins” to CN2 "T-CON PWB"

Pin	SBY	Run	Diode Check
1	0V	1.1V	1.27V
3	0V	1.1V	1.27V
5	0V	1.2V	1.27V
7	0V	1.1V	1.27V
9	0V	1V	1.27V
11	0V	1.1V	1.27V
13	Gnd	Gnd	Gnd
15	0V	1V	1.27V
17	0V	1.1V	1.27V
19	0V	1.1V	1.27V
21	0V	1.3V	1.27V
23	0V	1.1V	1.27V
25	0V	1.1V	1.27V

P1001 “Even Pins” to CN2 “T-CON PWB"

Pin	SBY	Run	Diode Check
2	0V	1.3V	1.27V
4	0V	1.3V	1.27V
6	0V	1.3V	1.27V
8	0V	1.2V	1.27V
10	0V	1.3V	1.27V
12	0V	1.3V	1.27V
14	Gnd	Gnd	Gnd
16	0V	1.3V	1.27V
18	0V	1.3V	1.27V
20	0V	1.3V	1.27V
22	0V	1.3V	1.27V
24	0V	1.3V	1.27V
26	0V	1.3V	1.27V

Pins identified in **Bold** and **Blue** are used to send video content to the T-CON PWB.

Diode Mode values taken with all Connectors Removed



Main PWB Connector P404 Voltage and Resistance

P404 CONNECTOR "MAIN PWB" to J1 "Front PWB Assy"

IC U1 is the Intelligent Sensor (pins 1–2)

IC U2 Controls 7 front LEDs Color and On/Off state (pins 1–2)

Pin	Label	STBY	Run	Diode Check
1	EYEQ-SCL	3.3V	3.3V	2.13V
2	EYEQ-SDA	3.3V	3.3V	2.13V
3	Gnd	Gnd	Gnd	Gnd
4	Gnd	Gnd	Gnd	Gnd
5	Key1	3.3V	3.3V	1.77V
6	Key2	3.3V	3.3V	1.77V
7	3.3V	0V	3.3V	0.55V
8	5V ST	5V	5V	1.48V
9	Power LED	0V	0V	OL
10	IR	3.9V	3.9V	1.24V
11	EYEQ-Reset	0V	0V	OL
12	Gnd	Gnd	Gnd	Gnd
13	No Label	0V	0V	OL
14	PWB-Buzz	0V	0.1V	3V
15	Gnd	Gnd	Gnd	Gnd

Diode Mode values taken with all Connectors Removed



Main PWB Connector P501 Voltage and Resistance

P501 CONNECTOR "Main" to "Speakers"

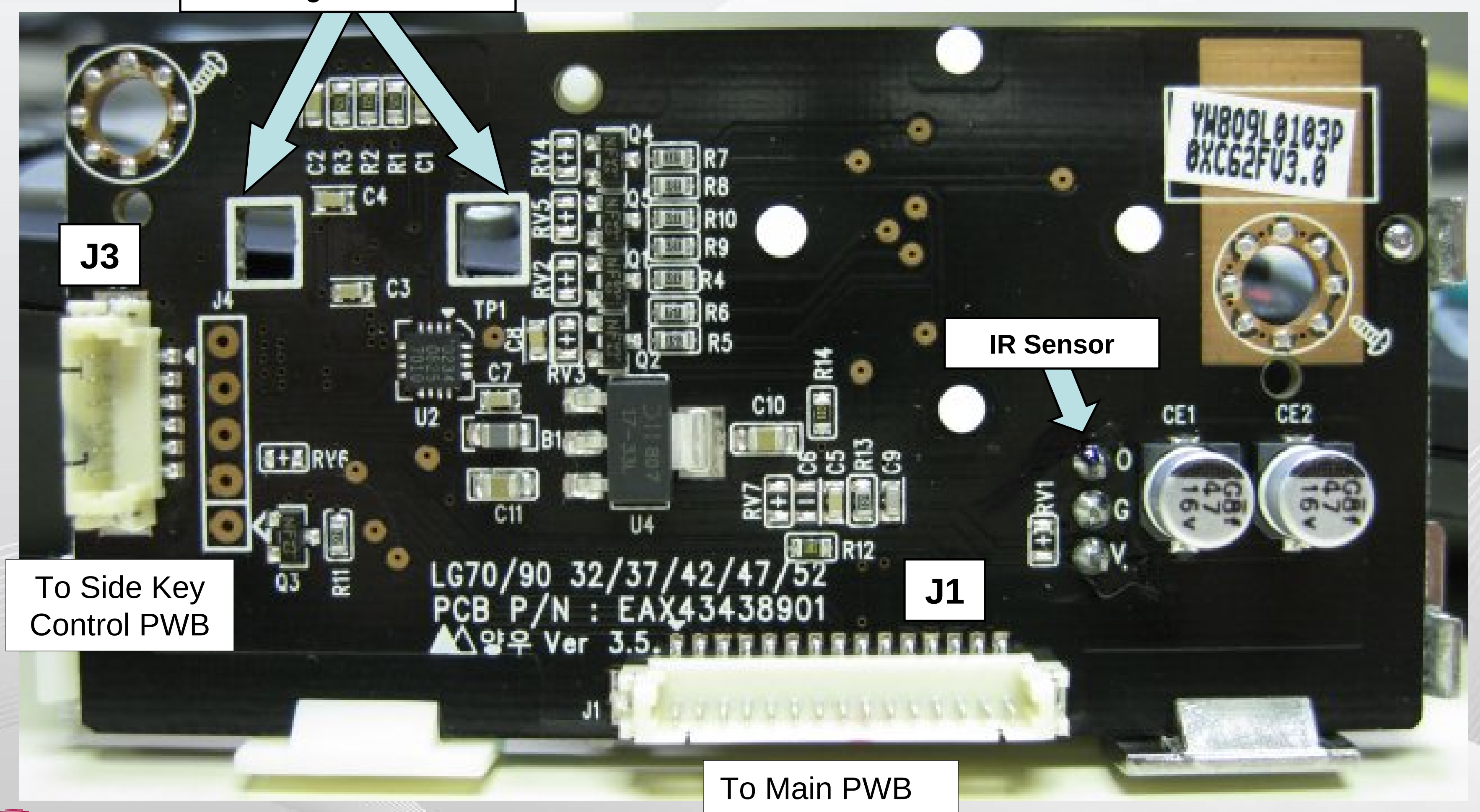
Pin	SBY	Run	Diode Check
1	0V	8V	2.58V
2	0V	8V	2.58V
3	0V	8V	2.58V
4	0V	8V	2.58V

Use speaker out to test for defective Audio Amp IC501

Diode Mode values taken with all Connectors Removed



Front PWB Assembly Layout



Front PWB Assembly (Front View) Layout

Sensor Close Up

Light Diffuser for the Intelligent Sensor

3 Sensors

POWER LEDs

IR Sensor

Touch Sensitive Power Switch



Front Control Connector J1 and J3 Voltage and Resistance

J1 CONNECTOR "FT CONTROL" to "MAIN PWB" P404

Pin	Label	STBY	Run	Diode Check
1	EYEQ-SCL	3.3V	3.3V	2.59V
2	EYEQ-SDA	3.3V	3.3V	2.59V
3	Gnd	Gnd	Gnd	Gnd
4	Gnd	Gnd	Gnd	Gnd
5	Key1	3.3V	3.3V	Open
6	Key2	3.3V	3.3V	Open
7	3.3V	0V	3.3V	Open
8	5V ST	5V	5V	1.9V
9	Power LED	0V	0V	Open
10	IR	3.9V	3.9V	Open
11	EYEQ-Reset	0V	0V	Open
12	Gnd	Gnd	Gnd	Gnd
13	Ready	0V	0V	Open
14	PWB-Buzz	0V	0V	Open
15	Gnd	Gnd	Gnd	Gnd

J3 from Ft Control to Side Key P100

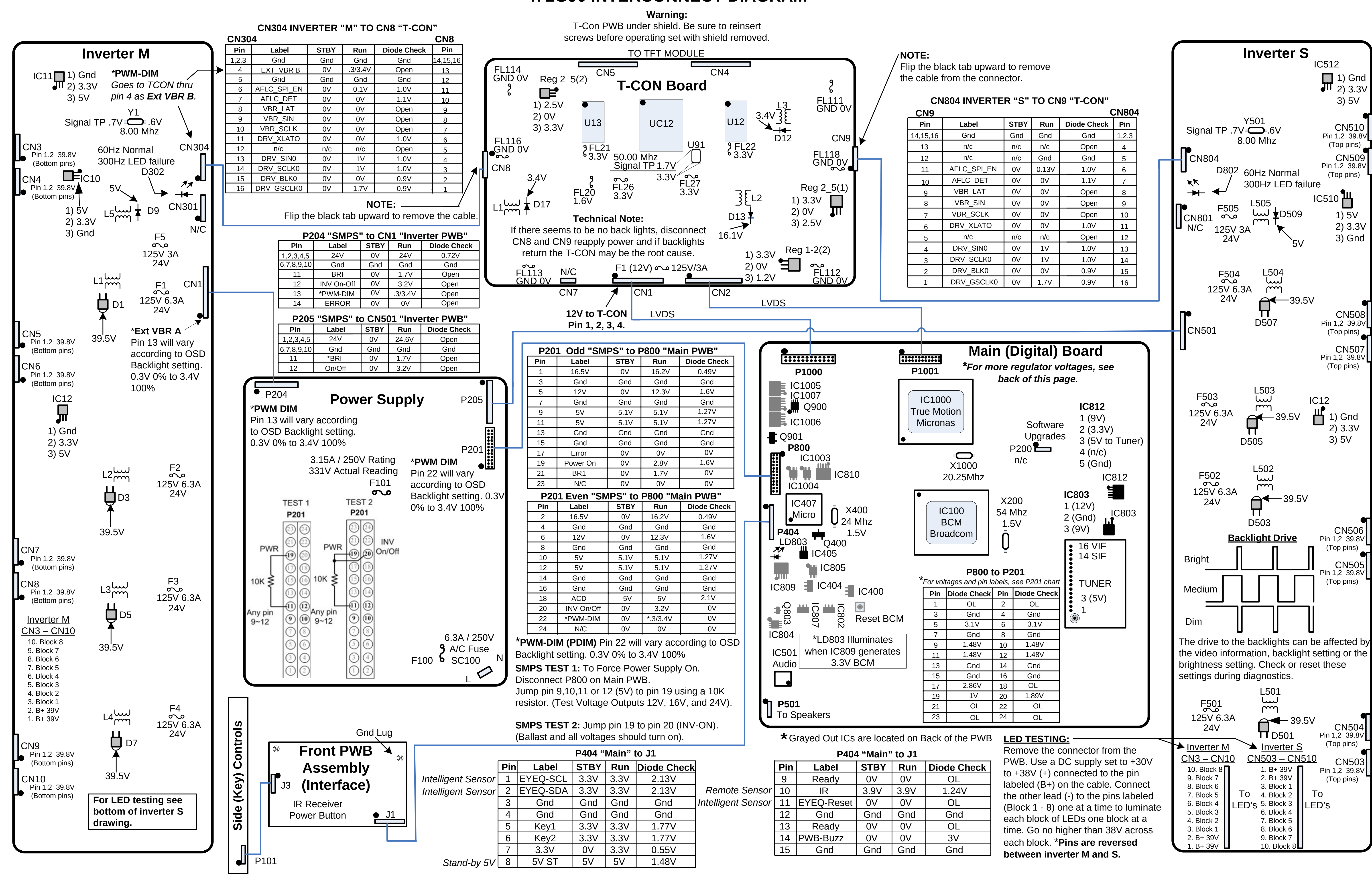
Pin	STBY	Run	Diode Check
1	3.3V	3.3V	Open
2	Gnd	Gnd	Gnd
3	3.3V	3.3V	Open
4	Gnd	Gnd	Gnd
5	0.1V	0.1V	Open
6	5.1V	5.1V	1.9V

Diode Mode values taken with all Connectors Removed

This section shows the 11X17 foldout that's available in the Paper and Adobe version of the Training Manual.



47LG90 INTERCONNECT DIAGRAM



CN304 INVERTER "M" TO CN8 "T-CON"

CN304 Pin	Label	STBY	Run	Diode Check	CN8 Pin
1,2,3	Gnd	Gnd	Gnd	Gnd	14,15,16
4	EXT_VBR B	0V	.3/3.4V	Open	13
5	Gnd	Gnd	Gnd	Gnd	12
6	AFLC_SPI_EN	0V	0.1V	1.0V	11
7	AFLC_DET	0V	0V	1.1V	10
8	VBR_LAT	0V	0V	Open	9
9	VBR_SIN	0V	0V	Open	8
10	VBR_SCLK	0V	0V	Open	7
11	DRV_XLATO	0V	0V	1.0V	6
12	n/c	n/c	n/c	Open	5
13	DRV_SIN0	0V	1V	1.0V	4
14	DRV_SCLK0	0V	1V	1.0V	3
15	DRV_BLK0	0V	0V	0.9V	2
16	DRV_GSCLK0	0V	1.7V	0.9V	1

P204 "SMPS" to CN1 "Inverter PWB"

Pin	Label	STBY	Run	Diode Check
1,2,3,4,5	24V	0V	24V	0.72V
6,7,8,9,10	Gnd	Gnd	Gnd	Gnd
11	BRI	0V	1.7V	Open
12	INV On-Off	0V	3.2V	Open
13	*PWM-DIM	0V	.3/3.4V	Open
14	ERROR	0V	0V	Open

P205 "SMPS" to CN501 "Inverter PWB"

Pin	Label	STBY	Run	Diode Check
1,2,3,4,5	24V	0V	24.6V	Open
6,7,8,9,10	Gnd	Gnd	Gnd	Gnd
11	*BRI	0V	1.7V	Open
12	On/Off	0V	3.2V	Open

P201 Odd "SMPS" to P800 "Main PWB"

Pin	Label	STBY	Run	Diode Check
1	16.5V	0V	16.2V	0.49V
3	Gnd	Gnd	Gnd	Gnd
5	12V	0V	12.3V	1.6V
7	Gnd	Gnd	Gnd	Gnd
9	5V	5.1V	5.1V	1.27V
11	5V	5.1V	5.1V	1.27V
13	Gnd	Gnd	Gnd	Gnd
15	Gnd	Gnd	Gnd	Gnd
17	Error	0V	0V	0V
19	Power On	0V	2.8V	1.6V
21	BR1	0V	1.7V	0V
23	N/C	0V	0V	0V

P201 Even "SMPS" to P800 "Main PWB"

Pin	Label	STBY	Run	Diode Check
2	16.5V	0V	16.2V	0.49V
4	Gnd	Gnd	Gnd	Gnd
6	12V	0V	12.3V	1.6V
8	Gnd	Gnd	Gnd	Gnd
10	5V	5.1V	5.1V	1.27V
12	5V	5.1V	5.1V	1.27V
14	Gnd	Gnd	Gnd	Gnd
16	Gnd	Gnd	Gnd	Gnd
18	ACD	5V	5V	2.1V
20	INV-On/Off	0V	3.2V	0V
22	*PWM-DIM	0V	*.3/3.4V	0V
24	N/C	0V	0V	0V

CN804 INVERTER "S" TO CN9 "T-CON"

CN9 Pin	Label	STBY	Run	Diode Check	CN804 Pin
14,15,16	Gnd	Gnd	Gnd	Gnd	1,2,3
13	n/c	n/c	n/c	Open	4
12	n/c	n/c	Gnd	Gnd	5
11	AFLC_SPI_EN	0V	0.13V	1.0V	6
10	AFLC_DET	0V	0V	1.1V	7
9	VBR_LAT	0V	0V	Open	8
8	VBR_SIN	0V	0V	Open	9
7	VBR_SCLK	0V	0V	Open	10
6	DRV_XLATO	0V	0V	1.0V	11
5	n/c	n/c	n/c	Open	12
4	DRV_SIN0	0V	1V	1.0V	13
3	DRV_SCLK0	0V	1V	1.0V	14
2	DRV_BLK0	0V	0V	0.9V	15
1	DRV_GSCLK0	0V	1.7V	0.9V	16

P800 to P201

*For voltages and pin labels, see P201 chart

Pin	Diode Check	Pin	Diode Check
1	OL	2	OL
3	Gnd	4	Gnd
5	3.1V	6	3.1V
7	Gnd	8	Gnd
9	1.48V	10	1.48V
11	1.48V	12	1.48V
13	Gnd	14	Gnd
15	Gnd	16	Gnd
17	2.86V	18	OL
19	1V	20	1.89V
21	OL	22	OL
23	OL	24	OL

P404 "Main" to J1

Pin	Label	STBY	Run	Diode Check
1	EYEQ-SCL	3.3V	3.3V	2.13V
2	EYEQ-SDA	3.3V	3.3V	2.13V
3	Gnd	Gnd	Gnd	Gnd
4	Gnd	Gnd	Gnd	Gnd
5	Key1	3.3V	3.3V	1.77V
6	Key2	3.3V	3.3V	1.77V
7	3.3V	0V	3.3V	0.55V
8	5V ST	5V	5V	1.48V

P404 "Main" to J1

Pin	Label	STBY	Run	Diode Check
9	Ready	0V	0V	OL
10	IR	3.9V	3.9V	1.24V
11	EYEQ-Reset	0V	0V	OL
12	Gnd	Gnd	Gnd	Gnd
13	Ready	0V	0V	OL
14	PWB-Buzz	0V	0V	3V
15	Gnd	Gnd	Gnd	Gnd

47LG90 MAIN PWB REGULATOR CHARTS

REGULATORS/ICs ON FRONT

IC405	STBY	RUN	Label
Function:	Micro Reset control		
Pins 1	0V	3.3V	Input 3.3VST-Micom
Pins 2	Gnd	Gnd	Gnd
Pins 3	0V	0V	Hi then Lo to Q400

IC803	STBY	RUN	
Function:	9V Regulator Also source for IC812		
Pins 1	0V	12V	Input
Pins 2	Gnd	Gnd	Gnd
Pins 3	0V	9V	Output

IC812	STBY	RUN	Label
Function:	5V-TU Regulator		
Pin 1	0V	9V	Input
Pin 2	0V	3.3V	On/Off Power-CTL 3.3V
Pin 3	0V	5V	Output
Pin 4	n/c	n/c	n/c
Pin 5	Gnd	Gnd	Gnd

Q400	STBY	RUN	Label
Function:	Reset to Micro		
B	0.59V	0.59V	Input from IC405
C	0V	0V	Hi-Lo to IC407 pin 4
E	Gnd	Gnd	Gnd

Q900	STBY	RUN	Label
Function:	LVDS Switch		
Pins 1,3	0V	12V	Input
Pins 2,4	0V	6V	On/Off
Pins 5-8	0V	12V	Output LVDS 12V

Q901	STBY	RUN	Label
Function:	Turns on Q900 LVDS Switch		
B	0V	0.7V	LVDS-Panel-Control
C	0V	0V	On low/Off hi
E	0V	0V	Gnd

REGULATORS/ICs ON BACK

IC102	STBY	RUN	Label
Function:	EEPROM for HDMI HDCP Key		
Pins 1,2	Gnd	Gnd	Gnd
Pins 3,4	Gnd	Gnd	Gnd
Pin 5	0V	3.78V	SDA
Pin 6	0V	3.78V	SCL
Pin 7	0V	0V	Write Protect
Pin 8	0V	5V	Vcc+5V

IC400	STBY	RUN	Label
Function:	BCM Reset Generator Drives IC401		
Pins 1	0V	3.3V	Input D3.3V-BCM
Pins 2	Gnd	Gnd	Gnd
Pins 3	0V	0V	Hi then Lo to IC401

IC401	STBY	RUN	Label
Function:	BCM Reset Smitt Trigger		
Pin 1	0V	3.3V	Input Reset
Pin 6	0V	3.3V	BCM Reset
Pin 7	Gnd	Gnd	Gnd
Pin 2,3,5	0V	0V	
Pin 14	0V	3.3V	B+ for IC +3.3V
Pins 8,9,10,11,12,13 not used			

IC403	STBY	RUN	Label
Function:	NV RAM-OLD		
Pins 1,2,3	0V	4.9V	Pull Up
Pins 4	Gnd	Gnd	Gnd
Pin 5	0V	3.4V	SDA
Pin 6	0V	3.4V	SCL
Pin 7	0V	0V	Write Protect
Pin 8	0V	5V	Vcc+5V

Q803	STBY	RUN	Label
Function:	Controls Q804 +5V Switch		
B	0V	0.72V	Input RL-ON
C	5V	0.02V	Turns on Q804
E	Gnd	Gnd	Gnd

Q804	STBY	RUN	Label
Function:	+5V Switch		
Pins 1,3	0V	5V	Input ST-5V
Pins 2,4	0V	0.3V	On/Off by Q803
Pins 5-8	0V	5V	Output +5V

IC404	STBY	RUN	
Function:	3.3VST-MICON Regulator		
Pins 1	Gnd	Gnd	Gnd
Pins 2	3.3V	3.3V	Output 3.3VST-MICON
Pins 3	5V	5V	Input ST-5V

IC406	STBY	RUN	
Function:	Micro EEPROM		
Pins 1,2,4	Gnd	Gnd	Gnd
Pins 3	3.3V	3.3V	Pull Up
Pin 5	3.3V	3.3V	SDA
Pin 6	3.3V	3.3V	SCL
Pin 7	Gnd	Gnd	Write Protect
Pin 8	3.3V	3.3V	3.3VST-Micom

IC408	STBY	RUN
Pin 1	5V	5V
Pin 2	5V	0.1V
Pin 3,4,5,7	n/c	n/c
Pin 6,8,9	Gnd	Gnd
Pin 10,11	0V	4.78V
Pin 12	0V	0.16V
Pin 13	0V	3.4V
Pin 14	0V	0V
Pin 15	5V	5V
Pin 16	5V	ST-5V

IC602	STBY	RUN
Pin 1	0V	0V
Pin 2	0V	0V
Pin 3	0V	0V
Pin 4	0V	0V
Pin 5	0V	5V
Pin 6	0V	5V
Pin 7	0V	0V
Pin 8	0V	4.8V

IC1003	STBY	RUN
Pin 1	0V	13V
Pin 2	0.68V	0V
Pin 3	0.6V	0V
Pin 4	0V	1.24V
Pin 5	3.3V	3.3V
Pin 6	0V	0V
Pin 7	0V	12V
Pin 8	0V	3.4V

IC802	STBY	RUN	Label
Function:	3.3V Regulator		
Pins 1	Gnd	Gnd	Gnd
Pins 2	0V	3.3V	Output
Pins 3	0V	5V	Input

IC701	STBY	RUN	
Function:	EEPROM for HDMI		
Pins 1,2	Gnd	Gnd	Gnd
Pins 3,4	Gnd	Gnd	Gnd
Pin 5	0V	5V	SDA
Pin 6	0V	4.7V	SCL
Pin 7	0V	5V	Write Protect
Pin 8	0V	4.73V	Vcc+5V

IC702	STBY	RUN	
Function:	EEPROM for RS232		
Pins 1,2	Gnd	Gnd	Gnd
Pins 3,4	Gnd	Gnd	Gnd
Pin 5	0V	0.15V	SDA
Pin 6	5V	0.13V	SCL
Pin 7	0V	0.13V	Write Protect
Pin 8	0V	5V	Vcc+5V

IC805	STBY	RUN	Label
Function:	D1.2V-BCM Regulator		
Pin 1	0V	6V	RST
Pin 2	0V	5V	Input
Pin 3	0V	1.2V	Output
Pin 4	0V	0V	Gnd
Pin 5	0V	3.3V	On/Off Power-CTL
Pin 6	0V	1.2V	FB
Pin 7	0V	1V	COMP
Pin 8	0V	0V	Gnd

IC807	STBY	RUN	Label
Function:	1.8V-NTP Regulator		
Pins 1	Gnd	Gnd	Gnd
Pins 2	0V	1.8V	Output
Pins 3	0V	3.3V	Input

IC809	STBY	RUN	Label
Function:	D3.3V Regulator Also Drives LD803		
Pin 1	0V	1.2V	On/Off Power-CTL
Pin 2	0V	5V	Input
Pin 3	Gnd	Gnd	Gnd
Pin 4	0V	3.4V	Output
Pin 5	0V	3.3V	ADJ

IC810	STBY	RUN	Label
Function:	D2.6V Regulator		
Pin 1	0V	2.5V	Input
Pin 2	0V	1.2V	On/Off Pwr-CTL 2.6V
Pin 3	Gnd	Gnd	Gnd
Pin 4	n/c	3.3V	ADJ
Pin 5	Gnd	5V	Output

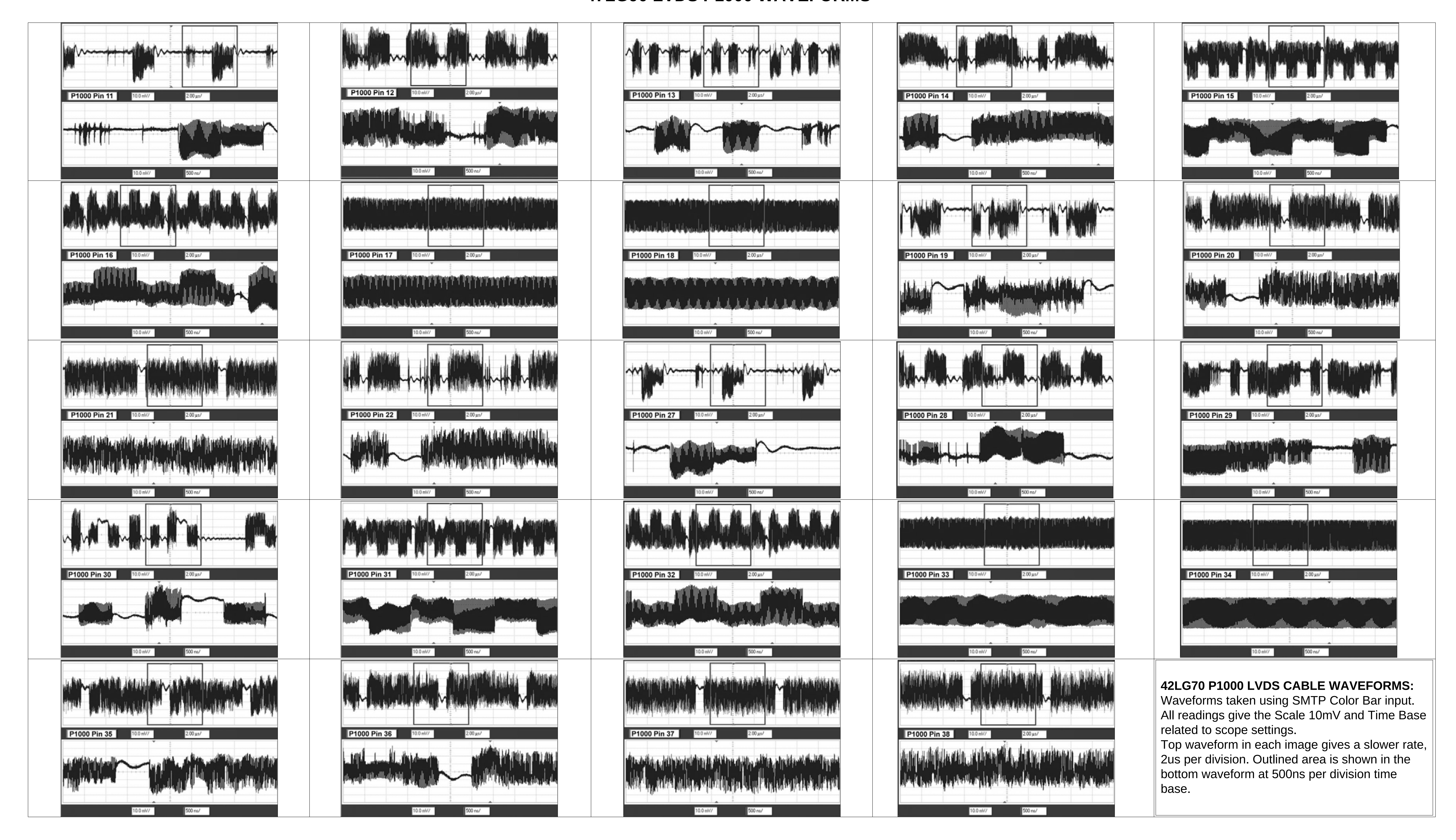
IC1004	STBY	RUN
Pin 1	0V	10V
Pin 2	0.78V	0V
Pin 3	0.7V	0V
Pin 4	0V	1.24V
Pin 5	0V	0V
Pin 6	0V	0V
Pin 7	0V	12V
Pin 8	0V	1.3V

IC1005	STBY	RUN
Pin 1	0V	0V
Pin 2	0V	3.4V
Pin 3	0V	0V
Pin 4	0V	1.4V
Pin 5	0V	1.2V

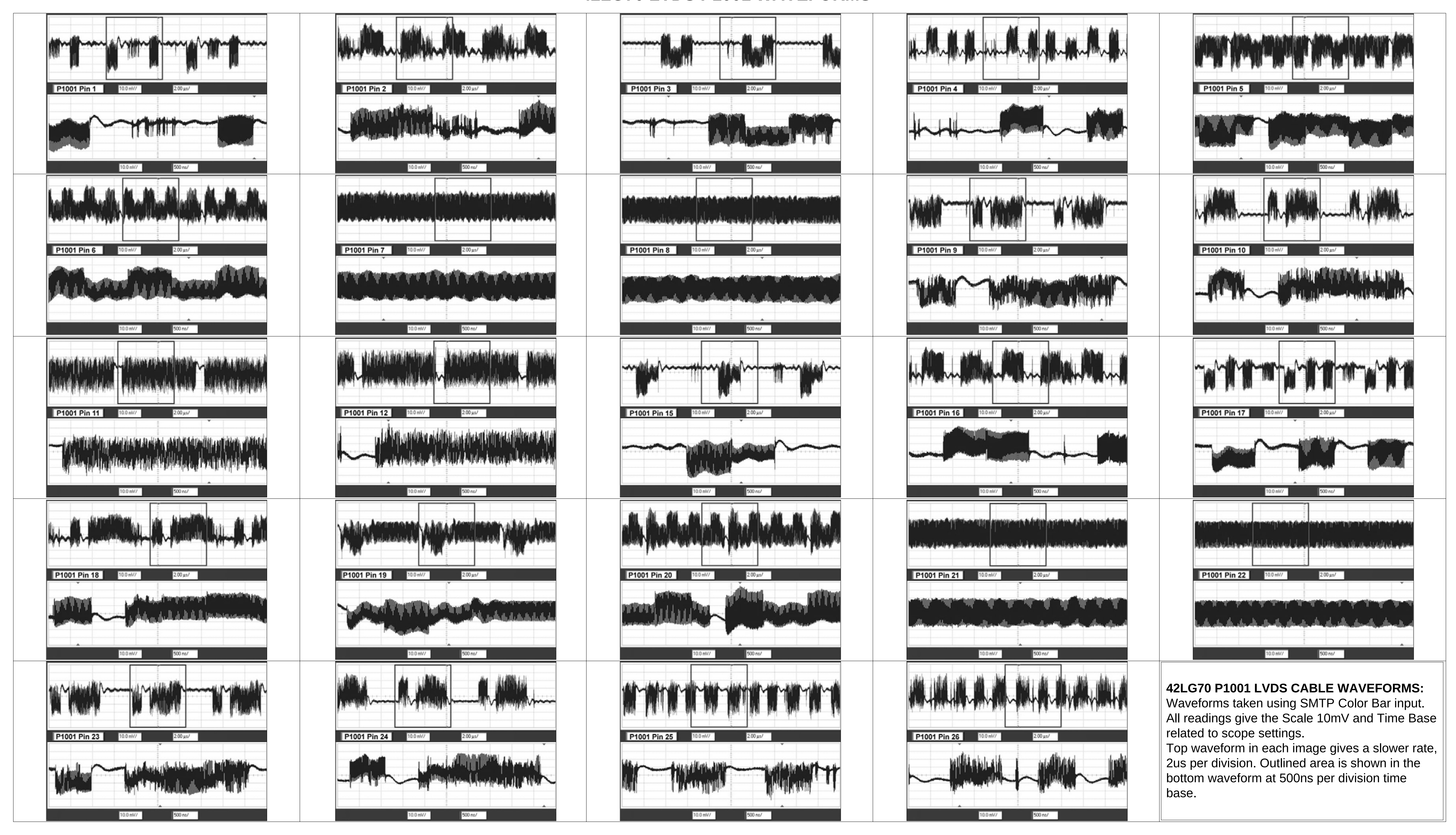
IC1006	STBY	RUN
Pin 1	0V	3.3V
Pin 2	0V	3.3V
Pin 3	0V	0V
Pin 4	0V	1.8V
Pin 5	0V	0V

IC1007	STBY	RUN
Pin 1	0V	3.3V
Pin 2	0V	3.3V
Pin 3	0V	0V
Pin 4	0V	0V
Pin 5	0V	2.5V

47LG90 LVDS P1000 WAVEFORMS



42LG70 LVDS P1001 WAVEFORMS





47LG90

Direct View LCD

This concludes the 47LG90 training session.

